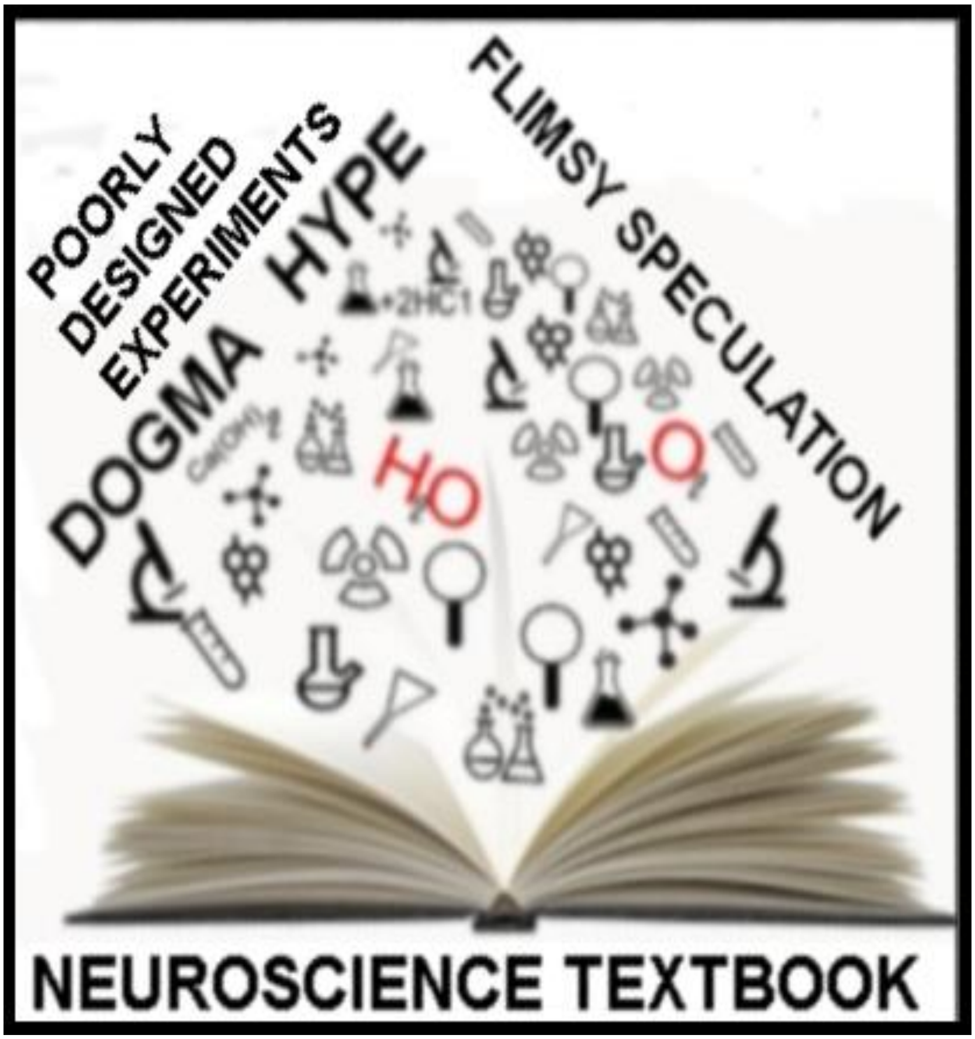
FAILING DOGMAS OF BRAIN RESEARCHERS



Mark Mahin

This book consists of posts from my "Head Truth" blog, which has a tagline of "The huge case for thinking minds do not come from brains." The book consists of posts from that blog published between July 2020 and March 2023. The material in this book consists of writing I produced after I compiled my book "Why Mind and Memory Cannot Be Brain Effects," and this book does not repeat any material in that book (although it involves a similar viewpoint).

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Head Truth

The huge case for thinking minds do not come from brains

Sunday, March 5, 2023

Studies New and Old Fail to Show a Big Link Between Brain States and Minds

A prediction of the dogma that your brain makes your mind is that the more brain injuries you have had, the worse off your mind should be. But a paper in the journal *Science ("*Effects of Penetrating Brain Injury on Intelligence Test Scores*")* refers to "**the large number of reports describing 'negative' findings -- that is, the absence of demonstrable deficits in test performance, despite the presence of large cerebral lesions, especially in the frontal lobes."** The 1957 paper compared IQ tests for 60 armed force members who had their intelligence tested before penetrating brain injuries, and also had their intelligence tested after their brain injuries. Speaking of results on IQ tests, the paper states, "These analyses demonstrated that lesions of the frontal and occipital lobes did not produces a significant decline in score, and that only lesions of parietal or temporal lobes of the left hemisphere showed a significant decrease." The soldiers with lesions in these areas actually performed higher on IQ tests after their penetrating brain injuries, with an average of about a 7% increase:

- The left nonparieto-temporal region
- The right parietal region
- The right temporal lobe
- The right parietotemporal lobe
- The right nonparieto-temporal region

The only decrease in IQ scores occurred with injuries to the left parietotemporal lobe. These results contradict the results of a new paper entitled "Graph lesion-deficit mapping of fluid intelligence." Instead of finding a decrease in intelligence after right frontal damage as reported by that new paper, the 1957 study found no decrease in intelligence after right frontal damage. The 1957 study used the Army General Classification Test, which is a more reliable test for intelligence than the Raven's Advanced Progressive Matrices test used by the "Graph lesion-deficit mapping of fluid intelligence" study. One study found less than a 50% correlation between the Raven's Advanced Progressive Matrices and full-scale IQ. The Raven's Advanced Progressive Matrices test is a test designed for people of above average intelligence, and is not very suited for testing intelligence damage in people of average intelligence.

There are other reasons for doubting the "Graph lesion-deficit mapping of fluid intelligence" paper. The study hinges upon estimates of "premorbid IQ," someone's IQ before they had some brain damage. The study claims to have something called the "NART IQ," which is an IQ based on a test called the

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National Adult Reading Test. The National Adult Reading Test can be described as a "quick and dirty" way of very roughly estimating intelligence. It is used by doctors to get a rough idea about a patient's intelligence. Estimates of the correlation between a person's performance on the English NART test and the person's IQ have tended to be about .7, which is a fairly strong correlation, although not a very strong correlation. But a study tested the Dutch version of the NART test and found that it "its current form is not appropriate anymore to estimate premorbid IQ in both young and older adults," having a correlation with intelligence of less than .5.

The study here ("The Relationship of Brain-Tissue Loss Volume and Lesion Location to Cognitive Deficit") tested IQ on 98 veterans with "penetrating brain wounds," finding those with wounds on the right side of the brain to have a mean IQ of 103, and those with wounds on the left side of the brain to have a mean IQ of 99. The paper "Neuropsychological and neurophysiological evaluation of cognitive deficits related to the severity of traumatic brain injury" studied the IQ of 90 patients, dividing them into three categories: mild traumatic brain injury, moderate traumatic brain injury, and severe traumatic brain injury. The mean IQ in each of these groups was about the same, being either 103 or 104. We read that **"a surprising finding was that specific intelligence subtests did not show [sensitivity] even for differentiation between severe and mild injury.**" Such a result is surprising only to those who think your brain makes your mind, not those who reject such an idea.

A recent study was one that attempted to correlate brain volume and intelligence in 262 healthy brain-scanned persons with an age between 55 and 80. An objectionable aspect of the study is that intelligence was measured using only a type of test that young people are known to do better on. We are told, "The Block Design test from the revised form of Wechsler Adult Intelligence Scale [41] was used to assess visuospatial ability and fluid IQ." If we follow the link in that statement, we come to a page telling us, "The results from this test show worse performance in older individuls."

Despite having a chosen a test that is not a good general test of intelligence, presumably to get a more statistically significant result, the authors report only a mild correlation between gray matter change and cognitive change: an R of only .21. The upper left part of their figure 2A (shown below) **shows more than 25 cases of people with less gray matter and more intelligence**. The result fails to show any clear link between gray matter loss in aging and intelligence.

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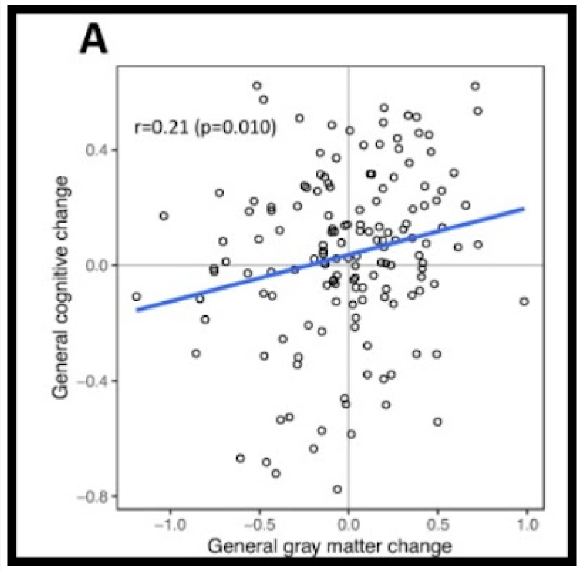

If the authors had used a better measure of intelligence (the full Wechsler Adult Intelligence test rather than only its Block Design test which seniors do worse on), the authors would have probably got a correlation smaller than the unimpressive correlation of only .21 that they report.

Recently a team of researchers decided to test the brain damage causes memory damage idea by using retirees of the National Football League, people who had played for years in the rough sport known as American football. Although they wear protective helmets, people who have played a long time in the National Football League tend to have had one or more concussions, particularly if they played in positions where concussions more often (such as offensive lineman positions or defensive lineman positions). Described in the press release here, the study "included 53 former NFL players age 50 or older as well as 26 healthy controls and 83 individuals with mild cognitive impairment or dementia who did not play collegiate or professional contact sports and matched as closely as possible to the NFL retirees by age and education." The retired NFL players in the study "had an average of 5.63 concussions, 8.89 years in the NFL, and 115.12 games played."

The press release for the study has a headline of "Head trauma doesn't predict memory problems in NFL retirees, UT Southwestern study shows." We read this:

"Previous studies have reported mixed findings on the relationship between head-injury exposure and neuropsychological functioning later in life. While some investigations have suggested former NFL players may exhibit lower verbal memory and executive function scores, others have not found differences compared to control groups, according to a review of the literature ...The [UT Southwestern] researchers report that ***retired football players had slightly lower memory scores compared to healthy peer controls but did not find this to be significantly associated with head-injury exposure."***

The scientific paper states that except for such slightly lower memory scores "no other group differences were observed, and **head-injury exposure did not predict neurocognitive performance at baseline or over time.**" There was little difference between people who had an average of six concussions and those who had no concussions.

Head Truth

The huge case for thinking minds do not come from brains

Monday, February 20, 2023

A Doctor Carves Up Claims About Mental Illness, Brain Structure and Genes

The Mad in America site (www.madinamerica.com) is not a philosophy of mind site, but a site dealing with the shortfalls of biological psychiatry, a psychiatric approach based on the idea that mental illnesses are mostly caused by brain states (as opposed to a person's life history and living conditions). At the Mad in America web site there are often well-written and scholarly articles that help to debunk some of the claims of "brains make minds" claimants. An example was a recent article by Peter C. Gøtzsche, MD. Near the beginning he makes this statement: "Despite 15 years of intense studying, I have been unable to find any important contribution of biological psychiatry to our understanding of the causes of psychiatric disorders and how they should best be treated." Referring to Attention Deficit Hyperactivity Disorder, the doctor says, "The fact is that ADHD is a social construct and that no reliable studies have shown any biological origin for this construct, or that the brains of people with this diagnosis are different to the brains of other people." The doctor states this:

"Another textbook noted that the findings obtained with structural and functional scans were inconsistent and varying, especially those obtained with functional MR scans that measure small changes in blood flow to various areas of the brain while the patient is given various tasks. ***This whole area is a mess of highly unreliable research. A 2009 meta-analysis found that the false positive rate in neuroimaging studies is between 10% and 40%.*** *And a 2012 report written for the American Psychiatric Association about neuroimaging biomarkers concluded that 'no studies have been published in journals indexed by the National Library of Medicine examining the predictive ability of neuroimaging for psychiatric disorders for either adults or children.' "*

The doctor then tells us this about a 2012 analysis of brain imaging studies:

"Carp found that many of the studies didn't report on critical methodological details about experimental design, data acquisition, or analysis, and many studies were underpowered. Data collection and analysis methods were highly flexible. The researchers had used 32 unique software packages, and there were nearly as many unique analysis pipelines as there were studies. Carp concluded that because the rate of false positive results increases with the flexibility of the design, ***the field of functional neuroimaging may be particularly vulnerable to false positives. Fewer than half of the studies reported the number of people rejected from analysis and the reasons for rejection, and the median sample size per group was only 15, which***

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generates an enormous risk of selective publication of those results that happened to agree with the investigators' prejudices. *The order of processing procedures also permits substantial flexibility in the analyses. Replication is essential for the trustworthiness of science, and scientific papers must report experimental procedures in sufficient detail that allows independent investigators to reproduce the experiments. This is far from the case in imaging studies."*

The doctor tells us that the same Carp analyzed a single brain scanning study, and found that using all of the different analysis pathways in the literature, that some "6,912 unique analysis pipelines" could be applied to the data, with almost as many different possible results arising from such analysis differences. That's pretty much a situation that can be described as "whatever you want to see, you can find," just by doing trial and error with different analysis pipelines until you see what you want. You can describe the situation with a rule of "if you torture the data long enough, it will confess to anything."

The doctor tells us this:

"In 2022, other researchers used three of the largest neuroimaging datasets available including a total of around 50,000 individuals to quantify brain-wide association studies' (BWAS) effect sizes and reproducibility as a function of sample size.[76] ***The median sample size was only 23 people. The researchers found that BWAS reproducibility requires samples with thousands of people.*** *As a commentator wrote, the study showed that almost every person diagnosed with depression will have the same brain connectivity as someone without the diagnosis, and almost every person diagnosed with ADHD will have the same brain volume as someone without ADHD.*[77] *Yet, in the small studies, correlations were almost always greater than 0.2 and sometimes much larger, which, as the researchers wrote, should not be believed."*

To help understand what is going on, imagine some scientist who happens to believe in astrology, and who believes that wealth is associated with month of birth. Using a large sample size such as 1000 subjects, no significant correlation will be found between these things. But it will be easy to report some small correlation if the researcher uses some small sample size such as only 15 subjects, and if he doesn't pre-register a particular specific hypothesis (such as the hypothesis that people born in June tend to end up wealthier), and if the researcher is free to not publish any result not matching what he hopes to find (something called the file drawer effect). Free to look for either slightly greater wealth or slightly less wealth for people born in any of 12 months of the year, and using only a small sample size such as 15 subjects, there will be a good chance that a small correlation will be found. Such a study (finding what is only false alarm noise) resembles the typical brain scanning study using only a small number of subjects. But for the scientist doing such a brain scan study, things are even easier. Instead of having only 12 months of the year to test, looking for some spurious correlation, such a scientist has hundreds of tiny brain regions he can check, until a little "statistical significance" can be found.

Unreliable junk correlations can always be found by people searching for such correlations in small data sets involving a small number of subjects such as 15. Such correlations will dissolve like the morning mist once a much larger set of subjects is tested. In general, we should have no confidence in any brain scan study that used only a dozen or two subjects in any of its study groups.

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Unfortunately, the great majority of such brain scan studies fall into such a category.

The doctor cites the following, an indication that many brain scan papers may not even match the data collected:

"The experience of the Editor-in-Chief of Molecular Brain *is also relevant to consider when assessing the merits of brain scanning studies in psychiatry. In 2020, he described what happened when he requested to see the raw data in 41 of the 180 manuscripts he had handled. Upon his requests, 21 of the 41 manuscripts were withdrawn by the authors, and he rejected a further 19 'because of insufficient raw data,' which suggested that the raw data might not exist, at least for some of the cases. Thus, only 1 of 41 papers (2%) passed his reasonable test."*

On another page the same doctor states this about attempts to show a genetic basis for mental illness:

"Many billions of dollars have been spent by the US National Institute for Mental Health (NIMH) on finding genes predisposing to psychiatric diseases and on finding their biological causes. This has resulted in thousands of studies of receptors, brain volumes, brain activity, and brain transmitters. ***Nothing useful has come out of this enormous investment apart from misleading stories about what the research showed.*** *This might have been expected from the outset. It is absurd, for example, to attribute a complex phenomenon like depression or psychosis or attention deficit and hyperactivity to one neurotransmitter when there are more than 200 such transmitters in the brain that interact in a very complex system we don't understand."*

The doctor dismisses claims that ADHD (Attention Deficit Hyperactivity Disorder) is caused by smaller brains:

"The study that claimed that children with an ADHD diagnosis have small brains has been widely condemned. Lancet Psychiatry devoted an entire issue to criticisms of the study. Allen Frances, chair of the DSM-IV task force (DSM is the Diagnostic and Statistical Manual of Mental Disorders, issued by the American Psychiatric Association), and Keith Conners, one of the first and most famous researchers on ADHD, re-analysed the data and found no brain differences."

The doctor points out that many of the researchers claiming brain links to mental illnesses have financial conflicts of interests, which can happen when a researcher receives money (directly or indirectly) from some pharmaceutical manufacturer who stands to profit when scientists make "brain problems cause mental illness" claims. On another page of the Mad in America site, we read this: "A study published in the *Community Mental Health Journal* finds that two-thirds of psychopharmacology textbooks have authors and/or editors that receive payments from pharmaceutical companies." We read of 11 million dollars paid to "11 of 21 editors/authors over a seven-year period."

Pharmaceutical manufacturer money is only part of the reason for regarding the typical experimental neuroscientist as being someone like a bribed juror. Today's scientists live in a "publish or perish" culture in which scientists are judged by how many papers they get published and how many citations such papers get. A scientist will be far more likely to get the prized research grant money if he proposes an experiment that might help to confirm some existing

- Exhibit A Suggesting Scientists Don't Understand How a Brain Could Store a Memory
- The Dubious Dogma That Brains Make Decisions
- Long Article Tries to Show Neural Memory Storage, but Gives No Real Evidence for It
- How Evidence for ESP Undermines the "Minds Come From Brains" Dogma
- Gender Differences in Brains Help Discredit Prevailing Dogmas About Brains
- Study Finds Equal Brain Connectivity in All Mammals
- Some Reasons the Main Theory of Neural Memory Storage Is Unbelievable
- Scientists Can't Persuasively Explain How a Brain Could Instantly Retrieve a Memory
- The Lack of Evidence for Memory-Storage Engram Cells
- Candid Confessions of the Cognitive Experts
- Global Workspace Theory Sure Isn't an Explanation for Consciousness
- When Animals Cast Doubt on Dogmas About Brains
- Memories Can Form Many Times Faster Than the Speed of Synapse Strengthening
- The Guy with the Smallest Brain Had the Highest IQ
- He Had Half a Brain and Above Normal Intelligence
- The Truth About Neurons and Synapses
- A Diagram of Explanatory Dysfunction in Academia
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- More Evidence of High Mental Function Despite Large Brain Damage
- The Lack of a Viable Theory of Neural Memory Encoding
- More Evidence That Neuron Loss Has Little Effect on Cognition
- Fraud and Misconduct Are Not Very Rare in Biology
- Reasons for Doubting Thought Comes from the Frontal Lobes or Prefrontal Cortex
- Why Most Animal Memory Experiments Tell Us Nothing About Human Memory
- Other Evidence of Human Paranormal Abilities

dogma about the brain, rather than an experiment that might produce results conflicting with such dogmas. Also, a scientist who finds no link between brain scans and some mental state has to report what is called a negative result or null result. But many journals have a policy of favoring papers reporting a positive result. So such a scientist has a great incentive to fiddle with his data analysis pipeline until some positive result can be claimed. The more the reported result fits in with prevailing dogmas of neuroscientists, the more likely the paper will be to get published, and the more paper citations the scientist will get. The more some ambiguous or borderline or questionable result is described in a paper title or abstract as showing a clear and important result, the more the authors will get the prized paper citations. Being part of such an ecosystem in which only results claiming to support prevailing dogmas are rewarded, such a scientist may be no impartial judge of truth, but more like a juror bribed to reach a particular conclusion.

Oh *really*?

In the article here, the doctor describes claims in psychiatry textbooks that psychiatric conditions such as depression are caused by chemical imbalances. He states, "The studies that have claimed that a common mental disorder like psychosis or depression starts with a chemical imbalance in the brain are all unreliable.'

at February 20, 2023

Labels: psychiatry

2 comments:

VM February 23, 2023 at 9:32 AM

Hi. Do you have any thoughts on the moderately recent and hyped up Attention Schema Theory by Michael Graziano? It's praised both because of it's "non-magical" approach to consciousness and having the framework for mind uploading/AGI.

Reply Delete

Mark Mahin February 23, 2023 at 12:21 PM

In a 2016 post I note a few silly-sounding statements by Graziano:
https://futureandcosmos.blogspot.com/2016/01/folly-of-consciousness-deniers.html
The theory you mention is described below:
https://aeon.co/essays/how-consciousness-works-and-why-we-believe-in-ghosts
There we read him state, "It has a very simple idea at its heart: that consciousness is a

- Why Brains Are Not Suitable for Storing Long Sequences Like Humans Remember
- Why Brain Scans Don't Show Brains Make Minds
- Why Strokes, Alzheimer's Disease and Drunkenness Don't Prove the “Brains Make Minds” Dogma
- Synaptic Density Studies Contradict the Most Popular Memory Theory
- The Rare "Total Recall" Effect That Conflicts with Brain Dogmas
- Physical Connections Do Nothing to Explain Cognition
- The Sociological Reasons Why Bad Explanations Persist in Academia
- Split-Brain Cases Conflict with "Brains Make Minds" Dogma
- Why So Much of Neuroscience News Is Unreliable
- An Analogy Clarifying Why the "Brain Stores All Your Memories" Dogma Is Untenable
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- What Is It That a Brain Does?
- Cloud Computing and a Non-Local Model of Consciousness
- Why We Do Not Understand the Origin of Complex Biological Innovations
- Our Minds May Arrive Top-Down Not Bottom-Up
- Fancy New Technology Fails to Prove Memory Dogmas
- The Argument for Determinism Collapses Once We Discard the "Minds Come from Brains" Dogma
- Animal Experiments Conflicting with the Dogma That the Brain Stores All Memories
- Memory Recall Reality Versus the "We Can't Remember Well" Bunk of Professors
- Neuroscientists Keep Using Misleading Coloring in Brain Visuals
- Most Scientists Don't Follow Formal Evidence Standards, Unlike Judges
- Experimental Evidence for ESP Is Well-Replicated
- Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades
- NIH Bets $1,434,188 That Synapses Don't Store Memories
- A New Case of Very Large Brain Damage and Normal Mental Function
- When Clue-Blind Professors Ignore All the Signs

Head Truth

The huge case for thinking minds do not come from brains

Monday, February 13, 2023

Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"

A recent scientific paper published in the journal Frontiers in Psychology is entitled "What if consciousness is not an emergent property of the brain? Observational and empirical challenges to materialistic models." The paper shows a view count of more than 30,000. The paper (by Helane Wahbeh, Dean Radin, Cedric Cannard and Arnaud Delorme) has some good aspects and some shortfalls.

The abstract states this:

"This review examines phenomena that apparently contradict the notion that consciousness is exclusively dependent on brain activity, including phenomena where consciousness appears to extend beyond the physical brain and body in both space and time. The mechanisms underlying these 'non-local' properties are vaguely suggestive of quantum entanglement in physics, but how such effects might manifest remains highly speculative."

It is very good to be paying attention to "phenomena where consciousness appears to extend beyond the physical brain and body in both space and time." But an immediate attempt to suggest such things are suggestive of quantum entanglement is probably misguided. Quantum entanglement seems to be a mysterious purely physical anomaly, having to do with very low-level microscopic things like particles, not very high-level non-physical things such as minds.

The paper then starts talking about "consciousness." It is always a mistake when pondering the human mind to be using language that keeps using this very reductive term "consciousness" over and over again. What we need to explain are minds, which involve a host of capabilities and very many diverse aspects, many very mysterious. The term "consciousness" is pretty much the weakest term you could use to describe human minds. Using the term "consciousness" for the human mind is like using the word "roundness" to describe planet Earth, a magnificent panoply of organisms.

I will pass over the paper's discussion of materialist theories of consciousness, some of which are discussed in other posts of this blog. In its middle the paper begins to discuss what it calls "non-local consciousness theories." Is that a good term to be using to describe alternatives to the dogma of "brains make minds"? No, that's not a very good term to be using. The first reason is that the shrink-speaking reductionist term "consciousness" is a very poor term to be using for the enormous wonder that is the human mind, something with so many different aspects and mysterious capabilities. The second reason why "non-

local consciousness theories" is not a very good term to be using is that we should not box ourselves in to any assumption that the human mind is non-local.

The following two ideas are both reasonable possibilities:

(1) There is some cosmic mind storehouse or mind source, and each person's mind is like a little piece of that cosmic mind; so your mind isn't really local.

(2) Your mind very much is local, but not at all a product of your brain. At some point in your early history you were given a soul or spirit that is at this time locally confined to your body. Such a gift may have come from some divine reality of cosmic mind-providing facility. After your body dies, that soul or spirit will be released, and will continue to exist.

We cannot call scenario 2 a non-local theory of your mind, because it does postulate that your mind is currently quite a local reality. There is also quite a bit of parapsychology evidence suggesting that scenario 2 is more likely than scenario 1. For example, during near-death experiences people often report floating out of their bodies, just as if they had a soul or spirit locally confined to a body before that happened.

So the term "non-local theory of consciousness" is not a term that should be used for most viewpoints denying that your brain is the source of your mind. It is better to refer to such theories as "top-down theories of the mind," contrasting such theories with "bottom-up theories of the mind" in which it is assumed that the mind arises from low-level neural activity. Another good term that you might use is to call such theories "non-neural theories of the mind." It is a mistake to commit yourself unnecessarily to some idea that the mind is non-local, when there is so much to suggest that our minds are currently mostly local.

The paper attempts to introduce the idea of "non-local theories of consciousness," saying this:

"Traditional materialists envision a world in which mathematics is more fundamental than physics, which is more fundamental than chemistry, which is, in turn, more fundamental than biology. Thus, in this way, physical processes are foundational to the generation of our biology. However, suppose we envision that consciousness is actually more foundational than physics. In that case, we can imagine that these other physical disciplines can arise from consciousness. In other words, if biology emerges from chemistry, chemistry from physics, and physics emerges from consciousness, then from this perspective, non-local consciousness phenomena would no longer be regarded as anomalous because consciousness can transcend some physical laws. Theories proposing this idea have been offered by Federico Faggin, Donald Hoffman, Bernardo Kastrup, Vernon Neppe, and numerous others. Most of these theories are speculative, while others are supported through mathematical arguments or empirical data (Hoffman et al., 2015; Neppe and Close, 2020; Faggin, 2021b). We briefly review a sample of non-local consciousness theories."

We then are given little summaries of eight different theories called "non-local consciousness theories." Are all speculative, and the paper fails to give any compelling rationale discussed for any of these theories. The discussion of these sounds like strange metaphysics. Some excerpts:

"Operational probabilistic theory": "Faggin views the physical world as a virtual reality metaphor, in which sophisticated avatars controlled by conscious beings interact with each other, where the body that controls the avatar exists outside the computer and is not part of the program."

"Interface theory of perception": "Space and time emerge from conscious agents' exchanges (Hoffman, 2014). Hoffman proposes that our perceptions (i.e., the conscious agents) are not views of a grounded truth but are more like a personal computer's operating system and interface."

"Analytic idealism":"Analytic idealism is a metaphysics that postulates consciousness as Nature's sole fundamental ground and that all natural phenomena are ultimately reducible to universal consciousness....Because there is only one universal consciousness, individuated living beings are described as dissociated mental complexes of the 'fundamentally unitary universal mind' (Kastrup, 2021, p. 267)." The description sounds intriguing, but the link is merely to a paper that is behind a paywall. Searching for "Bernardo Kastrup" on Google Scholar will, however, give you some interesting papers he wrote, such as the one here. It is possible to advance a credible form of idealism (the idea that everything is mental), but it requires elements far beyond what Kastrup postulates, which seems to lack any idea that we are here on purpose. What we need to explain are human minds and human mental phenomena in all their diversity, things vastly more than mere consciousness. So postulating a "universal consciousness" that we are fragments of does not seem adequate.

"Triadic dimensional vortical paradigm": "To address these discrepancies, Neppe and Close describe a mathematical model in which we exist in a 9-dimensional finite, quantized, volumetric, spinning reality embedded in an infinite continuity (9D+)...The model proposes that the 4D world we ordinarily experience is the physical component of this 9D+ existence."

"Zero-point field": "Joachim Keppler (2018) proposes a theory where the energy of the vacuum is the basis for consciousness, the so-called "zero-point field" (Keppler, 2018). This is a theory of panpsychism where consciousness permeates the universe yet is only concentrated and apparent in certain circumstances. Unlike other panpsychism theories, it is not the 'matter' that is conscious but empty space."

"Orchestrated objective reduction theory": This seems to actually be a version of "brains make minds" claims, and does not seem to belong in a list of "non-local theories of consciousness."

"Schooler hypothesis of subjective time": The speculation described does not actually sound like a non-local theory of consciousness.

"Theory of double causality": The speculation described does not actually sound like a non-local theory of consciousness.

None of the discussion of these theories seems to provide much of a reason for thinking that your mind does not come from your brain. In addition to the many shortfalls of the brain which indicate that it is not a credible source for our brain (which our paper authors have failed to mention), and in addition to the evidence from psychical research, which frequently involves evidence of capabilities and experiences that cannot be explained by assuming that your mind merely comes from your brain, there is a very large additional rationale

- Exhibit A Suggesting Scientists Don't Understand How a Brain Could Store a Memory
- The Dubious Dogma That Brains Make Decisions
- Long Article Tries to Show Neural Memory Storage, but Gives No Real Evidence for It
- How Evidence for ESP Undermines the "Minds Come From Brains" Dogma
- Gender Differences in Brains Help Discredit Prevailing Dogmas About Brains
- Study Finds Equal Brain Connectivity in All Mammals
- Some Reasons the Main Theory of Neural Memory Storage Is Unbelievable
- Scientists Can't Persuasively Explain How a Brain Could Instantly Retrieve a Memory
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- Memories Can Form Many Times Faster Than the Speed of Synapse Strengthening
- The Guy with the Smallest Brain Had the Highest IQ
- He Had Half a Brain and Above Normal Intelligence
- The Truth About Neurons and Synapses
- A Diagram of Explanatory Dysfunction in Academia
- The Brain Shows No Sign of Working Harder During Thinking or Recall
- More Evidence of High Mental Function Despite Large Brain Damage
- The Lack of a Viable Theory of Neural Memory Encoding
- More Evidence That Neuron Loss Has Little Effect on Cognition
- Fraud and Misconduct Are Not Very Rare in Biology
- Reasons for Doubting Thought Comes from the Frontal Lobes or Prefrontal Cortex
- Why Most Animal Memory Experiments Tell Us Nothing About Human Memory
- Other Evidence of Human Paranormal Abilities

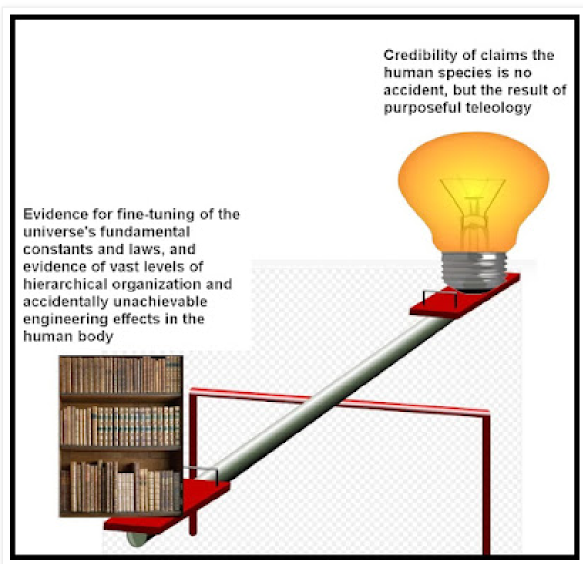
for thinking your mind does not come from your brain. But the "What If Consciousness Is Not an Emergent Property of the Brain?" fails completely to mention any part of that rationale. A quick sketch of that rationale is below:

(1) Filled with a host of engineering effects and thousands of impressive extremely complex protein inventions, and a host of fine-tuned cellular complexities, a human body is an enormously organized dynamic structure that is not credibly explained by any theories of material science, which utterly fail to credibly explain the progression from a speck-sized zygote to a full adult human body (a structure of enormous hierarchical organization not specified by DNA or its genes, which merely specify low-level chemical information).

(2) Hitting many a "distant bullseye," the physical universe is an extremely fine-tuned reality with many laws and just-right fundamental constants that would be incredibly unlikely to ever exist in any random universe.

(3) There is therefore an extremely large basis for assuming that our physical reality must be the result of some unfathomable purposeful agency acting to produce accidentally unachievable physical states. Purposeful agency is evident throughout biology, and the person denying such teleology is like a person on a rowboat in the middle of the Pacific Ocean who denies the existence of water.

(4) Given such a large basis for assuming that our physical bodies arise from some unfathomable purposeful superhuman agency, it is plausible to assume that such a purposeful causal agency is also the ultimate source of our minds.



For a fuller discussion of such a rationale, read my post "Your Physical Structure Did Not Arise Bottom-Up, So Why Think Your Mind Did?"

After pretty much wasting the reader's time by talking about eight speculative theories claimed as "non-local theories of consciousness," the "What If Consciousness Is Not an Emergent Property of the Brain?" paper begins to discuss some reasons for believing that your mind does not come from your brain. These reasons include:

(1) "Perceiving information about distant locations": That's a timid term for what is discussed, which is remote viewing. The paper fails to mention specific compelling evidence for remote viewing, although such evidence exists. A much better way of establishing "perceiving information about distant

- Why Brains Are Not Suitable for Storing Long Sequences Like Humans Remember
- Why Brain Scans Don't Show Brains Make Minds
- Why Strokes, Alzheimer's Disease and Drunkenness Don't Prove the “Brains Make Minds” Dogma
- Synaptic Density Studies Contradict the Most Popular Memory Theory
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- Neuroscientists Keep Using Misleading Coloring in Brain Visuals
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- Experimental Evidence for ESP Is Well-Replicated
- Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades
- NIH Bets $1,434,188 That Synapses Don't Store Memories
- A New Case of Very Large Brain Damage and Normal Mental Function
- When Clue-Blind Professors Ignore All the Signs

locations" would be to discuss the evidence for clairvoyance, which is massive, and stretches over about two hundred years.

(2) "Perceiving information from another person" : again we have a timid term for what is discussed, which is ESP (extrasensory perception) or telepathy. Referring to the Ganzfeld protocol for ESP tests, we read this:

"*The chance of the 'receiving' person correctly selecting the actual image is thus 25%. Over 120 published experiments have used this protocol, comprising about 4,000 individual trials, and the overall hit rate was just over 30%.*"

Results vastly better than this in large trials where the expected rate is 25% or less (with success rates as high as 73%) have been published, but our authors fail to mention them. This is another example of a senseless, timid tendency of people to ignore parapsychology results gathered before 1970.

(3) "Perceiving the future": we hear some details about the Bem precognition tests, with a claim that "There was a pre-stimulus effect demonstrating a physiological response prior to the unpredictable stimuli (fixed effect: overall effect size = 0.21, 95% CI = 0.15 – 0.27, $z = 6.9$, $p < 2.71 \times 10^{-12}$; Mossbridge et al., 2012)."

(4) "Apparent cognitive abilities beyond the experience/learning/skill of the person exhibiting them." We get this interesting paragraph:

"Another example is Indriði Indriðason (1883–1912), who apparently spoke multiple languages he did not know (Haraldsson, 2012). Similarly, Alec Harris spoke at length to witness Sir Alexander Cannon in Hindustani and Tibetan, two languages that Harris would have had no way of knowing, but Sir Alexander did know (Vandersande, 2008, p. 113). Other xenoglossy cases have also been documented by University of Virginia scientist Ian Stevenson (Stevenson and Pasricha, 1979, 1980). While anecdotal and subject to the known biases of experiential reports, these cases have been meticulously well-documented. Similar cases of 'acquired' and 'spontaneous savants' refer to individuals who, either through a traumatic event or with no apparent cause at all, suddenly gain exceptional musical or mathematical skills (Treffert, 2009)."

(5) "Non-local consciousness experiences are common." We are referred to some studies finding that psychical or paranormal experiences are very common. One of the studies has the interesting result below, in which 20% of a sample of "elite American scientists" report having had an out-of-body experience (OBE), and significant fractions of all groups reporting ESP experiences.

		Percent Reporting Experience Once or More						
	N	Response Rate (%)	Déjà vu	Night Paral-ysis	ESP	Contact with Dead	OBE	Belief in ESP*
Elite American scientists[2]	339	71	59	**	26	10	20**	20
University of Maryland[3]	214	42	89	37	44	25	27	66
Univ. of NC, Greensboro	532	98	86	32	42	20	18	60
ECSU (Afr.-Am. students)	391	99	80	50	35	25	18	68
Chinese student samples (three colleges)[4]	314	40	64	58	71	40	55	76
Tsukuba Univ., Japan	132	33	88	50	35	10	13	61

*percent considering ESP "a fact" or "a likely possibility"

(6) "Cognitive abilities can be retained when the brain is seriously compromised." Very many types of cases of this type could have been reported, using items such as I discuss in my posts here and here. But the only phenomenon discussed is terminal lucidity. We get a citation of the paper here referring to this mysterious phenomenon.

The evidence discussion in the second half of the paper is not half as strong as it could have been. But at least we can be thankful that the authors have introduced some readers to important evidence they may not have known about. Overall, the authors of the paper have been pretty clumsy and ineffective in presenting the case that the cause of human minds is something other than brains. The case for such a thing is many times greater than you would think from merely reading their paper. The biggest shortcoming of the paper is that the authors have totally failed to pay attention to a line of evidence extremely relevant to their subject, the many physical shortfalls of the brain which suggest very strongly that it cannot be the source of human mental phenomena such as instant learning, instant recall, very fast thinking, and the preservation of memories for more than 50 years. Such physical shortfalls of the brain include things such as the very short lifetime of synaptic proteins, the very high level of multiple types of signal noise in the brain, the lack of any known information writing or information reading mechanism in the brain capable of explaining the preservation or recall of school-learned information ("synapse strengthening" being no such thing), the lack of any addressing or indexing in the brain that could help explain instant recall, and the unreliable transmission of signals in chemical sysnapses, which transmit a nerve impulse with a reliability of less than 50%. Such very relevant physical shortfalls of the brain are discussed in detail in other posts of this blog.

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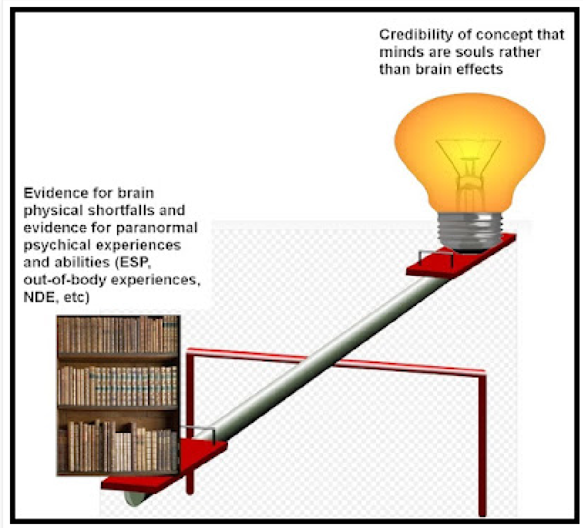

at February 13, 2023

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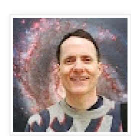

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March 2023 (2)

Head Truth

The huge case for thinking minds do not come from brains

Monday, February 6, 2023

Another Case of Physicalism Yielding Massive Reality Denial

It is a very great fallacy of try to reduce the problem of human mentality (the problem of explaining human minds and human mental phenomena) into some super-shrunken problem called "the problem of consciousness," or maybe "the problem of experience." The people who try to do such a thing are like someone who tries to reduce astronomy into a mere problem of explaining comets. Just as explaining comets is only a tiny sliver of the job of astronomy, explaining consciousness is only a tiny sliver of problem of explaining minds.

The silliness of people who pose a mere "problem of consciousness" or "problem of experience" rather than a problem of human mentality is illustrated in the visual below. The word cloud on the screen shows a vast diversity of mental things to be explained: imagination, selfhood, ideation, appreciation, memorization, morality, recognition, consciousness, emotions, speech, comprehension, creativity, recall, insight, beliefs, reminiscence, trances, introspection, pleasure, pain, reading, writing, awareness, perception, knowledge, recognition, attention, personality, fascination, interest, visualization, ESP, dreaming, volition, OBEs and NDEs. But the person in front of the screen has foolishly ignored this great complexity and phenomenal diversity, and has wrongly stated that all that he needs to explain is consciousness.

Recently we had the publication of an essay by a physicalist who offers an attempt to solve what his essay describes as the problem of consciousness, with what his essay brags is an "ingenuously simple solution" to such a problem. The physicalist attempted to explain the mind like this:

(1) He attempts to reduce a human mind to a mere perception of external objects.

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(2) He then says that your perceptions are simply the objects you are perceiving.

Voila! Through such lunacy, the mind is eliminated. According to the physicalist, you simply are what you perceive. So when you look at some dog poop, you *are* the dog poop.

This is very crazy indeed. Yes, you have perceptions, but you also have a mind, that includes beliefs, memories, ideas, knowledge, and many other things. There is nothing known in the physical world that corresponds to such things. No one has ever been able to observe beliefs, memories, ideas or knowledge in the human brain, and any one claiming to see such things in a brain is just someone seeing what he wants to see, like someone seeing the face of Jesus in his toast.

Our physicalist writes this:

"So what is your experience? It is the subset of physical objects taking place relative to your body. The mind is identical with the (relative) object."

I notice a very big error in the quote above. We first have a question "what is your experience?" The answer then refers to "the mind," as if a mind is mere experience. No, a mind is an extremely diverse reality vastly more than just "your experience." Your experience is partially a stream of sensations that changes from day to day and hour to hour. Your mind is a stable thing that includes very much knowledge that persists from year to year, as well as beliefs and attitudes that can stay the same year after year. Your mind is vastly more than just your experience, and your mind is vastly more stable than your experience, which changes from hour to hour.

Our physicalist states that his theory "has no place either for ideas or thinkers, only for relative objects that bring each other into existence by means of mutual causal relations." This is just a very silly form of reality denial. There really are ideas and thinkers, and any philosophy of mind that "has no place" for them is nonsense. The idea that there are no ideas is just itself a very dumb idea, like denying the existence of the sun and the moon. Our physicalist is like a person who has written a book trying to prove there are no such things as books.

What about all the mental realities other than perception? Our physicalist who has denied all such things makes a feeble attempt to make his denials not so embarrassing by claiming that imagination is a "special case" of perception. No, imagination is not a "special case" of perception. Perception is when you see things with your eyes open. Imagination (which can be entirely non-visual) is when you can get ideas about things you may have never seen. Imagination can involve eyes-closed visualization of something you have never seen. Or imagination can involve something that is not at all visual. I may imagine the abstract idea that an extraterrestrial civilization might be killed by a cosmic gamma ray burst, without having any visual image associated with such a thing. Imagination is not perception, and is not a "special case" of perception.

Our physicalist then refers to intentionality, first-person perspective and self-consciousness, and claims that these are mere "epicycles." His references to epicycles is extremely inappropriate. In the philosophy of science, an epicycle refers to some imaginative and not-very-plausible hypothetical detail dreamed up to explain some shortfall in your theory. Things such as intentionality and first-person perspective and self-consciousness are not imaginative hypotheses but indisputable realities, and they were not invented to help anyone solve shortcomings of theories.

What's going on in the physicalist's essay is mainly just massive reality denial, done in the service of physicalism (the utterly erroneous belief that nothing exists but the physical). He says that his theory of the mind "has no place for anything but objects in relation to each other (relative objects)." That's the most massive kind of reality denial, because so much of reality is reality other than "objects." Physicalism should come with a warning label like this: "CAUTION: This philosophical assumption can lead to reality denial a thousand times more severe than Holocaust denialism." Because physicalism is a position radically opposed to the massive irrefutable reality of human mental experience that is not physical, many a physicalist will become the most extreme type of denialist.

Physicalism is like this

The physicalist's reasoning I have mentioned is an example of what you might call "desert-island reasoning." By "desert-island reasoning" I mean the kind of armchair reasoning someone might do after being stranded alone on a desert island, without having access to any books or communication devices. Desert-island reasoning is not based on studying the details of human experience or the details of the human body or the details of the physical universe. A good sign you have some desert-island reasoning is when you get a long essay (like the one I have quoted from) that does not include any mention of specific facts or the experiences of specific people, and does not include a link to any external writing. Desert-island reasoning will not get you very far in understanding minds. To get some good ideas about what a human mind is:

(1) Study at great length the vast diversity of human experience, including anomalous human experiences and anomalous medical case histories.

(2) Study at great length the organization and functional complexity and vast diversity of engineering effects in human bodies and in other organisms.

(3) Study neuroscience and the behavior of neuroscientists with a very close examination of the current methodological shortfalls of neuroscientists, a close examination of the church-like belief community conformism and overconfidence of neuroscientists, and also a very close examination of the many physical shortfalls of the human brain that undermine claims that the brain is the source of the mind and the storage place of memories.

(4) Study the sudden origin of the universe and the evidence for enormous fine-tuning in the fundamental constants and laws of the universe.

(5) Study carefully the biggest mysteries science has not been able to explain, such as the origin of life and the progression from a speck-sized zygote to a full human body.

All of this studying and additional thought may lead you to eventually get some good ideas about the nature of the human mind, perhaps something like what I discuss here. You won't get very far by lazily ignoring such studies, and by merely trying to use a little armchair reasoning to get some "ingeniously simple solution" to long-standing problems of the mind.

at February 06, 2023 No comments:

Labels: physicalism

Monday, January 30, 2023

The Vague Unfounded Boasts of Biology Sound Like the Vague Unfounded Boasts of Astrophysics

An article at the Big Think website has a title sounding like it might be an example of scientist humility. The title is "Why the origin of life and the Universe itself might be forever unknowable." But despite the humble-sounding title, the article has several examples of unfounded boasts of knowledge. The author is astrophysicist Adam Frank, and Frank is a little frank, but not nearly frank enough.

The article starts out with the preposterous "we're almost done" insinuation that scientists have only two explanatory problems left: the problem of the origin of the universe and the origin of the life. We read this:

"Humanity has two old, profound questions. The first is about the origin of the Universe; the second about the origin of life."

To the contrary, humanity has a host of unsolved explanatory problems, including the unsolved problem of the origin of mind, the unsolved problem of how memory and learning occur, the unsolved problem of origin of the human species, the unsolved problem of the origin of language, the unsolved problem of the composition of the universe, the unsolved problem of the origin of very complex and organized biological innovations, and the unsolved problem of the origin of the adult human body, involving an utterly mysterious progression from a speck-sized zygote to the vast organization of the human body, a structure not specified by DNA (contrary to many erroneous claims). Human knowledge about reality is merely fragmentary.

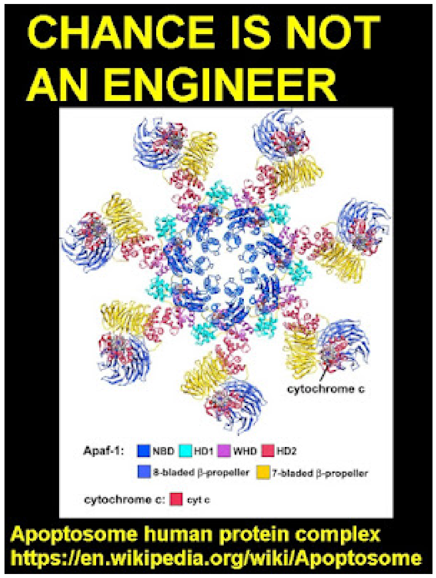
Frank gives us the following lame attempt to explain how planet Earth got all its organisms:

"We know that evolution on Earth (and probably anywhere else in the Universe) works by a process called descent with modification. Organisms reproduce and pass their genes on to their children. Every now and then, random mutations occur. If they lead to better fitness within the environment, entirely new organisms may appear."

There are very many reasons why this is not a credible explanation of the origin of species such as mankind. The first is that organisms such as ourselves involve hierarchically structured and enormously organized complexity that cannot be credibly explained by appealing to random mutations. What we have in a human body is enormously organized and fine-tuned complexity so immense that it can be called an enormous engineering effect. In his interesting book *Cosmological Koans*, which has some nice flourishes of literary style, the physicist Anthony Aquirre tells us about just how complex biological life is. He states the following on page 338:

"On the physical level, biological creatures are so much more complex in a functional way than current artifacts of our technology that there's almost no comparison. The most elaborate and sophisticated human-designed machines, while quite impressive, are utter child's play compared with the workings of a cell: a cell contains on the order of 100 trillion atoms, and probably billions of quite complex molecules working with amazing precision. The most complex engineered machines -- modern jet aircraft, for example -- have several million parts. Thus, perhaps all the jetliners in the world (without people in them, of course) could compete in functional complexity with a lowly bacterium."

So if a lowly bacterium has a functional complexity comparable to a jetliner, what kind of functional complexity does a human body have? Functional complexity so great it can be called an enormously strong engineering effect. But chance is not an engineer; random mutations don't engineer things; and accidents don't produce engineering. So Frank's little explanation of how we got vastly organized organisms does not work.



(Image credit: Yuan et al. 2010, Structure of an apoptosome-procaspase-9 CARD complex)

Shown above is the apoptosome protein complex involved in programmed cell death. Note the references in the chart to propellers, which remind of us how much the complex resembles a product of engineering. Humans have more than 20,000 types of protein molecules, and the average protein molecule is a very special arrangement of more than 400 different amino acid parts. The arrangement of amino acids in each protein is as hard-to-achieve by chance as 400 accidentally typed characters making a paragraph of grammatical and functional prose. Extremely complex engineering arises in the form of protein complexes, in which different proteins (often useless by themselves) work together as team members to achieve some dramatic functional result. We see that in the visual above, where multiple instances of several different types of protein molecules come together to form an extremely complex structure consisting of thousands of well-arranged amino acid parts, and consisting of a total of tens of thousands of well-arranged atoms. A page describes the action of these individually useless proteins coming together to form a functional protein complex:

"The process of programmed cell death, also known as apoptosis, is highly regulated, and the decision to die is made through ***the coordinated action of many molecules****. The apoptosome plays the role of gatekeeper in one of the major processes, termed the intrinsic pathway. It lies between the molecules that sense a problem and the molecules that disassemble the cell once the choice is made.* ***Normally, the many subunits of the apoptosome are separated and inactive,*** *circulating harmlessly through the cell. When trouble occurs,* ***they assemble into a star-shaped complex****, which activates protein-cutting caspases that get apoptosis started."*

Another site that includes a 3D rotating animation of the structure shown above says this:

*"****The apoptosome is revealed as a wheel-like complex with seven spokes****. On top of* ***the wheel is a spiral-shaped disk that allows for docking*** *and subsequent activation of proteases, which then target cellular components. When active,* ***the apoptosome is revealed to be a dynamic machine*** *with three to five protease molecules tethered to the wheel at any given time."*

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Below from page 137 of a PhD thesis is a list of biological systems described as if they were very impressive machinery:

Subcellular assembly	**Sample of 'molecular machine' language**	**Source reference**
Ribosome	"probably the most sophisticated machine ever made"	Garrett (1999)
Proteasome	"a molecular machine designed for controlled proteolysis"	Voges et al. (1999)
Glideosome	"a molecular machine powering motility"	Keeley et al. (2003)
Spliceosome	"among the most complex macromolecular machines known"	Nilsen (2003)
Blood clotting system	"a typical example of a molecular machine"	Spronk et al. (2003)
Photosynthetic system	"the most elaborate nanoscale biological machine in nature"	Imahori (2004)
Bacterial flagellum	"an exquisitely engineered chemi-osmotic nanomachine"	Pallen et al. (2005)
Myosin filament	"a complicated machine of many moving parts"	Ohki et al. (2006
RNA degradasome	"a supramolecular machine dedicated to RNA processing"	Marcaida et al. (2006)
RNA Polymerase	"a multifunctional molecular machine"	Haag et al. (2007)

An article by scientists discusses molecular machines in the human body:

"A molecular machine (or 'nanomachine') is a mechanical device that is measured in nanometers (millionths of a millimeter, or units of 10^{-9} meter; on the scale of a single molecule) and converts chemical, electrical or optical energy to controlled mechanical work [1,2]. The

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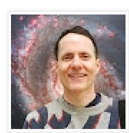

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human body can be viewed as a complex ensemble of nanomachines [3,4]. These tiny machines are responsible for the directed transport of macromolecules, membranes or chromosomes within the cytoplasm. They play a critical role in virtually every biological process (e.g., muscle contraction, cell division, intracellular transport, ATP production and genomic transcription)...Myosin, kinesin and their relatives are linear motors that convert the energy of ATP hydrolysis into mechanical work."

Humans are not machines, largely because humans have minds and lives and understanding that no machine has. But within our bodies are many types of extremely complex functional systems that can reasonably be described as molecular machinery or engineering. Such things are not credibly explained as being produced by the "random mutations" evoked by Frank. As some Harvard scientists stated, "A wide variety of protein structures exist in nature, however the evolutionary origins of this panoply of proteins remain unknown."

Two extremely important things to recognize are below:

- The credibility of all claims of an accidental origin of biological organisms is inversely proportional to the degree of hierarchical organization and broken-by-small-changes functional complexity in such organisms (the more of the latter, the less credible the former).
- The discovered amount of hierarchical organization and broken-by-small-changes functional complexity in living organisms has grown *exponentially* in the past century.

Reminding me of examples discussed in my post "When Scientists Claim to See Things They Never Saw," Frank claims scientists saw something they didn't actually see. He says this:

"Using a variety of methods, biologists have mapped out the tree of relationships between living things across Earth's long inhabited history, which goes back more than three billion years. They have been able to see when the different lineages of life split off from each other. For example, humans, chimpanzees, and bonobos share a common ancestor who lived about six million years ago."

No such splitting of ancestral lineages has actually been observed by scientists, who lack any power to observe any such things claimed to have occurred over thousands of generations millions of years ago. We do not know that "humans, chimpanzees, and bonobos share a common ancestor who lived about six million years ago." That claim is merely a guess.

In 2017 bbc.com had a long article entitled "We have still not found the missing link between us and apes." The article discusses the history of postulating a common ancestor linking current ape-like animals and humans. What we get is a story of a great deal of disagreement and changes in the prevailing narrative. Referring to a "last common ancestor" or LCA, we are told, "Surprisingly, the last 15 years has actually seen popular opinion begin to swing away from the idea of a chimp-like LCA, and towards a model closer to that argued by people like Strauss in the 1940s." Of one analysis, we are told, "One of the implications of their interpretations was that all sorts of anatomical features shared by gibbons, orangutans, chimps and gorillas must have evolved independently in each of these apes." That claim should raise suspicions, as such coincidental independent evolution is highly improbable.

The article says the following about a Last Common Ancestor:

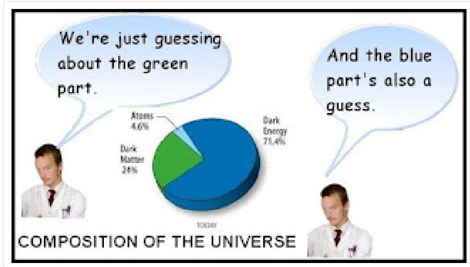
" 'There has been a community shift, where people have begun to question what was an emerging consensus for a chimp-like LCA,' says Young. But even that is not the end of the story. There are still 'chimp-like LCA' advocates out there, and they are fighting back...Of course, only if and when fossils of the LCA itself come to light will the debate finally draw to a close.….It is possible, they say, that the LCA might actually have lived 13 – not seven – million years ago....There are also a few researchers who take a completely different view. For instance, Schwartz is adamant that it is orangutans, not chimpanzees, that are our sister species."

A scientific article tells us, "Few fields of research are subject to so many competing hypotheses, as illustrated by the variable number of ancestral species assigned to the human lineage by different authors, ranging from four to a maximum of 25." Such gaps and disagreements should not at all inspire our confidence that scientists have a firm gasp on this matter. The scientists are apparently fighting among themselves, disagreeing about the most basic things, and missing many of the fossils they need.

All claims that humans naturally evolved from any kind of ape-like or chimp-like or orangutan-like ancestor are lacking in credibility. Since DNA does not specify the anatomy of an organism, there are no possible random mutations in DNA that can explain very complex changes in anatomy. Since brains do not credibly explain the human mind, for reasons discussed on the posts of this blog, the origin of the human mind is utterly beyond the power of evolutionary biologists to explain. In his essay "The Limits of Natural Selection as Applied to Man," it was forcibly pointed out by the co-creator of the theory of natural selection (Alfred Russel Wallace) that natural selection cannot explain some of these higher capabilities of the human mind. In fact, in his his 1910 book *The World of Life: a Manifestation of Creative Power, Directive Mind and Ultimate Purpose,* Wallace argued that natural selection and random variations were very far indeed from being sufficient to account for the wonders of biology.

Frank's vague reference to "a common ancestor" between chimps and humans (without mentioning a particular species) follows the convention of most evolutionary biologists. They speak vaguely of such a common ancestor, without mentioning some specific species identified in fossils. No such ancestor has been found in the fossil record. The vague claims here remind us of what scientists say in regard to dark matter and dark energy. Astrophysicists such as Frank are always boasting that they understand what makes up most of the universe, claiming that most of the universe consists of dark energy and dark matter. But what is this dark matter and dark energy? No specific dark energy particle has ever been found. No specific dark matter particle has ever been found. Dark matter and dark energy have never been directly observed. The missing chimp/human ancestor fossils are like the missing dark matter particles and the missing dark energy particles, which are like the missing memory traces never found in the human brain by microscopic study.

Labels



Just as scientists have scanned the heavens with the most powerful telescopes without ever seeing dark energy or dark matter, scientists have scanned the human brain with the most powerful microscopes, without ever finding any human memory. It's not just that they failed to read any learned information from microscopically examining human brain tissue. It's something much worse: that they never found in neural tissue anything that looked anything like stored information learned in school. Stored information has a particular hallmark: the hallmark of token repetitions. There is no token repetition to be found anywhere in the brain, except for the nucleotide base pair tokens in DNA which merely stand for particular types of amino acids.

So our neuroscientists vaguely claiming they know memories are stored in the brain (without providing any plausible specifics of how that could work) are like our astrophysicists vaguely claiming they know that most of the universe is dark matter and dark energy (without providing any specifics about observed dark matter particles and dark energy particles). In both cases, people who don't understand things are pretending they have knowledge that they don't have, and are confusing speculations with knowledge.

Frank gives us another case of scientists pretending to know things they don't actually know when he gives us the rather laughable boasting statement below, boasting that scientists know something about a Last Universal Common Ancestor of life:

"We do not know much about this creature. We do not have direct fossils of its existence. But we can infer its existence from the tree of life. There must have been a last universal common ancestor that gave root to all life on Earth. The recognition of LUCA is a triumph of modern biological sciences."

Scientists have something to boast about when they actually observe things, rather than merely making inferences based on ever-changing speculations about ancestry trees of life, unsupported by a credible theory of how such trees could have arisen. And there was no "recognition of LUCA," because you can't recognize something that you've never seen. And why is Frank saying that the origin of life may never be found? It's because all attempts to support the groundless notion of abiogenesis (a natural origin of life from non-life) have failed miserably. Such a failure (and a lack of any credible natural explanation for the enormously abundant engineering effects in organisms) means we can have no confidence in the common ancestry claims Frank has made.

Frank tells us that we may never know what caused the Big Bang (the universe's origin), and in this regard he has a good excuse for such a failure. The excuse is that according to the Big Bang theory itself, the universe should have been so dense during its first 100,000 years that all observations of such a time should forever be physically impossible, regardless of how powerful future telescopes are. But in regard to memory, neuroscientists have no excuse for their failure to read memories from brain tissue despite their claims that

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

memory is brain-based. Scientists were able to discover information in microscopic DNA way back around 1950. With their current microscopic technology, scientists should be able to discover irrefutable proof of brain storage of memories, if it existed. Their failure to find any such thing is one of many strong reasons for rejecting their claims that memories are stored in brains.

We read here that "Cryo-electron microscopy (cryo-EM) single particle analysis (SPA) is a technique for reconstructing the three-dimensional structure of a biomacromolecule using projected images acquired with an electron microscope and was the subject of the Nobel Prize for Chemistry in 2017." A 2020 article is entitled "Cryo–electron microscopy breaks the atomic resolution barrier at last." We read this:

" Now, for the first time, scientists have sharpened cryo-EM's resolution to the atomic level, allowing them to pinpoint the positions of individual atoms in a variety of proteins at a resolution that rivals x-ray crystallography's. 'This is just amazing,' says Melanie Ohi, a cryo-EM expert at the University of Michigan, Ann Arbor. 'To see this level of detail, it's just beautiful.' Because the heightened resolution reveals exactly how complex cellular machines carry out their jobs, improvements in cryo-EM should yield countless new insights into biology."

This greater microscopic resolution is giving us all the more dramatic evidence for accidentally unachievable molecular machinery in human bodies, while at the same making ever-more-clear the failure of neuroscientists to detect any such thing as learned conceptual information stored in brains, where no trace can be found of any facts learned in school, and no trace can be found of any words people memorized or any sights people ever saw. The article shows us a stunning visualization of an enormously organized apoferritin protein complex looking even more complex than the one in the visual above.

at January 30, 2023 No comments:

Labels: molecular machinery, origin of biological complexity

Monday, January 23, 2023

Neuroscientists Keep Wrongly Assuming the Source of Something Must Be Near Its Observed Manifestations

A post of mine written back in 2014 shows a very strong consistency with my current beliefs after making a very thorough study of the brain. The post was entitled "The Receptacle Hypothesis: Could Your Mind Have Come From an External Source?" Back in 2014 I wrote this:

"Imagine a very young girl who lives in a house with a flower garden in its backyard. The small girl hasn't yet gone to school, and knows nothing about the details of flowers or bees. The only times she ever observes bees is when she sees them hovering near the flowers in her garden. For this young girl, there is a 100% correlation between the observation of bees and the observation of flowers.

The girl then comes up with what seems to her to be a perfectly reasonable explanation for where bees come from. She concludes that bees are produced by flowers-- that flowers make bees just like apple trees make apples. This theory fits with all of her observations and knowledge. The actual truth is quite different – the bees come from a

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

distant source (a bee hive) and they are attracted to flowers. But since the girl knows nothing of bee hives, she doesn't think of this explanation. The girl misidentifies something local (the flower) as the cause of something (the bee) which actually comes from something distant (the bee hive).

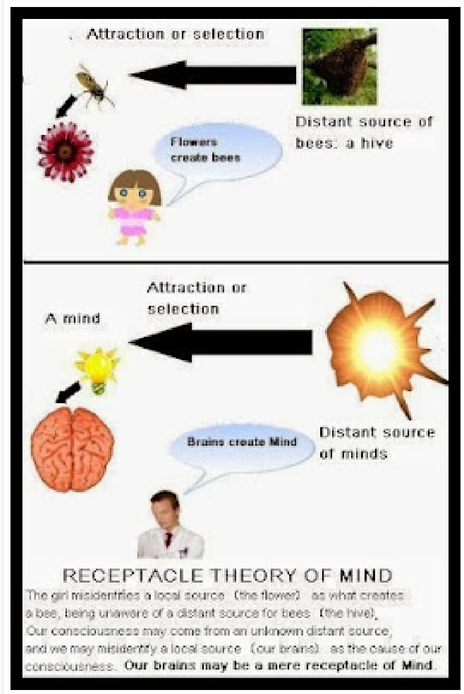
It could be that the average person who concludes that consciousness is created by brain activity is just like this little girl. It could be that each human consciousness arises from some distant external source, and then is somehow attracted to a newborn human. It could be that a human body acts as a kind of receptacle for human consciousness, but does not actually produce that consciousness. This external source of consciousness could be rather like the beehive, a person's consciousness could be rather like the bee, and a human brain could be rather like the flower – something to which consciousness that arose from elsewhere is attracted towards, and hovers around. Somewhat like the little girl mentioned above, we may be misidentifying something local (our brains) as the cause of something (our consciousness) which may actually have originated from something distant (some unknown external source of consciousness outside of our bodies).

Let us consider another case that will illustrate this point that correlation does not prove causation (and which will give another example where something local is misidentified as the source of something with a distant source). Imagine a scientist in the year 1700 trying to explain comets. The scientist would consider all the observations he knew about comets – that comets seem to appear rather suddenly out in space not far from planets such as Mars and Jupiter. The scientist might then conclude: planets produce comets. He might guess that comets are occasionally burped out from planets rather like a man spits out food. Given his limited knowledge, he would have almost no other way of explaining comets.

Again, this would be a case where a local source is misidentified as the cause of something which comes from a distant source. Now we know that comets come from a ring-like cloud of comets called the Oort Cloud located far beyond the orbit of the most distant planet. The comets come from the distant source we cannot see because they are attracted (by gravity) to things we can see (the sun and the planets). Similarly, it may be that a human consciousness arises from some distant source we know nothing of, and that an individual consciousness is somehow attracted towards some local thing that we can see, a newborn human body.

It might be that the human brain is not what is producing our consciousness. It might be that the human body is just acting as a kind of receptacle for consciousness that originated from some distant source."

Below is the visual I gave in my 2014 post to illustrate the idea:



When I wrote these words back in 2014 1 had not yet made much of a study of the brain. Now, after having spent thousands of hours researching the brain, this idea I had suggested in 2014 seems like no mere possibility but more like a necessity. To explain why, I can return to the analogy of the little girl, the flowers and the bees.

Suppose the little girl had studied flowers and their parts. It might have dawned on her that there is nothing in flowers capable of explaining the origin of bees. You can imagine some "bee construction" machinery, and flowers have none of the characteristics of such machinery. Upon considering how there is nothing in a flower that can explain the origin of a bee, the girl would have a good reason for rejecting the "flowers make bees" hypothesis.

A similar state of affairs occurs with the brain and the mind. The brain lacks the features we might expect it to have if it were the source of our minds. We cannot identify any physical feature that would tend to produce a conscious being with a sense of self. The whole idea of mind arising from matter seems no more logical than blood dripping from a stone. But in the case of memory, we can identify a set of physical features that we would expect a brain to have if it were something that could explain our memory. From our work with computers, we know the type of features that enable the permanent storage and instant retrieval of information. They are features such as this:

- Something such as a read-write head allowing information to be written to some spot where it is permanently stored, and read from such a spot.
- Some stable physical substrate allowing information transmitted to the system to be permanently stored without the information quickly decaying.
- Features such as addressing and indexing allowing the instant retrieval of specific items of stored data.
- Some system allowing the instant storage of new information.
- Some system for allowing information to be translated into symbolic tokens that are used for information storage (tokens such

as letters or binary bits).

- Transmission paths allowing a very fast and error-free transmission of information between different parts of the system.

No such things exist in the brain. Brains have no indexing and no addressing. Neurons don't come with neuron numbers or neuron addresses. There is no known physical substrate allowing sensory information to be permanently stored in the brain without the information quickly decaying. The synapses claimed to be the site of memory storage are "shifting sands" type of things, made of proteins with average lifetimes of less than two weeks; and such synapses are attached to dendritic spines with an average lifetime of a few months or less.

DNA is a stable substrate for information storage, but there is zero evidence that things learned by the senses are stored in DNA. No one has ever found information learned in school stored in DNA, or in any other part of the brain. The synapses in the brain are almost all chemical synapses, which do not transmit information reliably (a signal will pass across a synapse with a reliability of less than 50%). Neurons and synapses are extremely noisy structures, and chemical synapses have a very strong cumulative slowing effect on signal transmission. The brain has no known mechanism for instantly storing memories, and the "synapse strengthening" claimed to be behind memory storage would require protein synthesis taking minutes or hours, being way to slow to account for new memories that humans can instantly acquire. Brains are too slow, too noisy and too unstable to be the source of human memory phenomena and human thinking, which is often blazing fast and 100% reliable (as when Hamlet actors recall more than a thousand lines of dialog with complete accuracy), and which routinely involves the preservation of memories for several decades.

Besides the two examples in my 2014 post, I can think of two more examples that remind me of the fallacy of assuming that the source of something must be near its observed manifestations:

(1) If someone had no idea what caused TV shows to be displayed on a TV screen, he might assume that somehow the shows arise from the machine itself: that a TV is some kind of "TV show generator." This assumption would be very false. TV shows arise from complex causal affairs (called "TV show filming") that typically takes place many miles from the TV that displays the show.

(2) On a planet that was perpetually covered with clouds (which we may call planet Evercloudy), scientists who had never seen a sun might wonder how there arises the light that lights their planet and the heat that heats their planet. They might wrongly assume that such heat and light comes from the planet itself -- that maybe rocks or dirt emit heat and light. This answer would be dead wrong. The heat and light that blessed their planet would actually come from a very distant source that was unknown to them: the star which their planet revolved around.

The hypothesis that minds must come from some source outside of a body can be supported not just by looking inward, asking ourselves whether brains have the characteristics that could explain minds. Such a hypothesis can also be supported by looking outward, and asking: do we have any reason to suspect there is some great mysterious causal reality outside of our bodies and our planet? Looking outward, we find ourselves in a universe that suddenly began in a fine-tuned manner, a universe that against the most gigantic odds has laws and fundamental constants allowing creatures such as ourselves to exist. Nature had to hit many a distant bulls-eye to end up with a universe meeting the many requirements for organisms such as ourselves. Seeing such fine-tuning, and also what seems like the most enormous teleology in the origination of fantastically organized physical bodies such as the human body, and being unable to even explain the progression from a speck-sized zygote to a full human body without resorting to the lie that DNA is a body blueprint, we have every reason to suspect some unfathomably powerful mysterious causal reality beyond our understanding, which may (directly or indirectly) help explain how we got our minds that our brains cannot explain.

The little girl's hypothesis about flowers yielding bees would be hard to disprove. But you could discredit it by carefully filming hundreds of flowers, and observing that the bees always appeared from a point outside of the flower, rather than from within it. As for brains making minds, one way to discredit it is by very carefully studying what goes on in minds during near-death experiences in which the brain tends to shut down because of the heart stopping. At the link here we have a survey of survivors of the 1976 Tangshan earthquake which killed some 240,000 people. 81 survivors were interviewed, by talking to patients at a convalescent hospital, patients who had been admitted because of injuries suffered in the earthquake. 40 out of 81 reported "full blown" near-death experiences (7 or greater on the Greyson scale). 51% (41 out of 81) reported "thinking unusually fast," 28% (23 out of 81) reported "sudden understanding," 43% (35 out of 81) reported "an out-of-body experience," and 65% (53 out of 81) reported "unusually vivid thoughts." The results are the opposite of what we would expect from the "brains make minds" idea. If your brain makes your mind, you would never have an experience of floating out of your body, and you would never report your thoughts speeding up and your understanding increasing when your brain shut down.

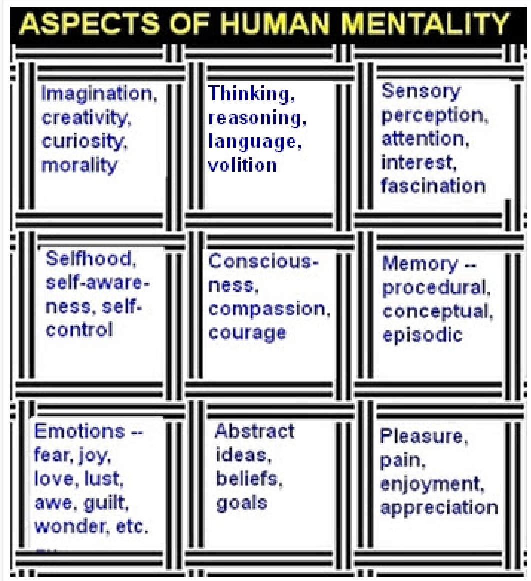
at January 23, 2023 No comments:

Monday, January 16, 2023

The Two Huge Mistakes Involved in Typical Talk of a "Hard Problem of Consciousness"

There are many discussions that talk about a “hard problem of consciousness,” and such discussions tend to involve two huge mistakes. The first mistake is in trying to shrink the gigantic problem of explaining human mentality into a relatively tiny problem of explaining consciousness.

The visual below may help show what I mean. We see in the grid various diverse aspects of human mentality. There is the problem of how humans got all these diverse mental aspects and capabilities. As shown in the grid, consciousness is merely a tiny part of human mentality. The grid below is actually a simplification, for it does not even mention many unusual aspects of human mentality that are studied by parapsychologists.



The problem of human mentality is the problem of credibly explaining the thirty or forty most interesting types of human mental experiences, human mental characteristics and human mental capabilities. These include things such as these:

- imagination
- self-hood
- abstract idea creation
- appreciation
- memory formation
- moral thinking and moral behavior
- instantaneous memory recall
- instantaneous creation of permanent new memories
- memory persistence for as long as 50 years or more
- emotions
- speaking in a language
- understanding spoken language
- creativity
- insight
- beliefs
- pleasure
- pain
- reading ability
- writing ability
- ordinary awareness of surroundings
- visual perception
- recognition
- auditory perception
- attention
- fascination and interest
- the correct recall of large bodies of sequential information (such as when someone playing Hamlet recalls all his lines correctly)
- eyes-closed visualization

- extrasensory perception (ESP)
- dreaming
- volition
- out-of-body experiences
- apparition sightings

Reductionist theorists love it when people do not raise the big problem of explaining human mentality but instead raise a much tinier problem of the problem of consciousness. Then such theorists can attempt to offer some little neural explanation and then say, “You see, the brain can explain consciousness.” Whenever such theorists attempt to do that, we should always point out that the problem of explaining human mentality is very many times larger and harder than a mere problem of consciousness.

When such theorists write their articles, they love to reference philosopher David Chalmers, a thinker who coined the phrase "hard problem of consciousness." One of the earliest uses by Chalmers of such a phrase was in a December 1995 *Scientific American* article by Chalmers. A careful look at the article reveals a great deal going wrong.

In the article (entitled "The Puzzle of Conscious Experience") Chalmers makes a very misguided and poorly conceived distinction between what he calls "easy problems of consciousness" and what he calls a "hard problem of consciousness." Chalmers wrote this:

"The easy problems of consciousness include the following: How can a human subject discriminate sensory stimuli and react to them appropriately? How does the brain integrate information from many different sources and use this information to control behavior? How is it that subjects can verbalize their internal states? Although all these questions are associated with consciousness, they all concern the objective mechanisms of the cognitive system. Consequently, we have every reason to expect that continued work in cognitive psychology and neuroscience will answer them."

This was triumphalist hogwash. We do not know that brains "integrate information from many different sources and use this information to control behavior." We simply know that humans integrate integrate information from many different sources. There is no understanding of how a brain could control behavior, no credible theories of how a brain could store learned information, and zero reason to expect that "continued work in cognitive psychology and neuroscience" would lead to some understanding of how neurons could control behavior. The idea of identifying a "hard problem of consciousness" and calling the other problems of explaining minds "easy problems" was very misguided, a blundering bifurcation. Nature gave us no warrant for dividing up philosophy of mind problems into one "hard" problem and a bunch of other "easy" problems.

There are many dozens or hundreds of very hard problems involving the explanation of human minds and human mental experiences. The attempt by Chalmers to insinuate that there was only one hard problem of explaining the mind (what he called a "hard problem of consciousness") was folly. This is the kind of error that would tend to come from either (1) someone was not a very serious critical scholar of neuroscience and its very many shortfalls, unfounded claims and poor research practices, or (2) someone who was not a very serious and thorough scholar of psychical research and the more hard-to-explain mental phenomena such as paranormal phenomena.

Just as ill-conceived was how Chalmers defined what he called "the hard problem of consciousness." In his 1995 Scientific American article he defined his so-called "hard problem of consciousness" like this: "The hard problem, in contrast, is the question of how physical processes in the brain give rise to subjective experience." Because we do not know that any physical processes in the brain give rise to subjective experience, and have very strong reasons for doubting that any such processes exist, it was an error to be posing such a question framed in such a way. It is a big mistake to ask questions that assume some claim that has not been proven, and that there are very good reasons for doubting.

By 1995 there already existed the strongest reasons for doubting that "physical processes in the brain give rise to subjective experience." One major reason was the complete failure of anyone to explain how subjective experience (something mental) could ever be caused by something merely physical. Another major reason very well documented by 1995 was the existence of human mental experience in persons whose brain was shut down after cardiac arrest. During near-death experiences people can have extremely vivid subjective experience while their brains have temporarily shut down because their hearts have stopped. Many cases of that happening had been well documented by 1995.

In his 1995 article Chalmers makes the poor reasoning below:

"I am not denying that consciousness arises from the brain. We know, for example, that the subjective experience of vision is closely linked to processes in the visual cortex. It is the link itself that perplexes, however. Remarkably, subjective experience seems to emerge from a physical process. But we have no idea how or why this is."

Some kind of relation between the visual cortex and the "subjective experience of vision" does nothing to establish that "consciousness arises from the brain." Similarly, some kind of link between your eyeglasses and "the subjective experience of vision" does nothing to show that your eyeglasses produce consciousness. Chalmers confesses here that we "have no idea how or why this is" that subjective experience could arise from a brain, but he failed to realize the very obvious implication of such thing: that such a failure should cause us to doubt the dogma that subjective experience does arise from the brain.

What we are left with is a quotation above that sounds as silly as someone saying, "I do not doubt that extraterrestrials are manipulating the US stock market, but I don't know how or why they are doing it." If you don't know how or why X, then you should typically doubt that you actually know X.

Later in the same article Chalmers tells us this:

"Thus, a complete theory will have two components: physical laws, telling us about the behavior of physical systems from the infinitesimal to the cosmological, and what we might call psychophysical laws, telling us how

some of those systems are associated with conscious experience. These two components will constitute a true theory of everything."

People who say things like this make me wince. Physicists sound very silly every time they talk about a "theory of everything," and philosophers sound every bit as silly when they use that term. The two things mentioned leave out almost everything to be explained in biology, astronomy, cosmology, history, sociology, chemistry and a dozen other major topics, as well as 98% of what needs to be explained to explain the human mind and its experiences (a topic of oceanic depth). Serious and very thorough scholars of the human mind and human mental experiences don't tend to talk in such a way, because they tend to be humbled by the very large variety of utterly baffling phenomena they encounter in their studies.

At the link here (obtained from a Google Scholar search of Chalmers name) you can read a 1995 book by Chalmers entitled "The Conscious Mind: In Search of a Theory of Conscious Experience." In the second paragraph of this 391-page book, we have an unwise "we're almost finished" kind of claim that "we do not have many detailed theories of cognition, to be sure, but there are few problems of principle; the details cannot be too far off." This is enormously false. Neuroscientists have not got much of anywhere in explaining any of the main mysteries of the mind, which are very many.

Reading this book, I fail to get a strong impression of Chalmers being a very serious and thorough scholar of either the human brain or neuroscience (although he uses the term "brain" nearly 200 times). The fact that in the book he only refers to synapses two times (not saying anything substantive about them) and proteins one time may indicate that when he wrote the book he had failed to do his homework very vigorously, by thoroughly studying the human brain and neuroscientist claims about it and its components, and the physical limitations and shortfalls of the human brain. In the book Chalmers also seems to show no familiarity with psychical research (research into paranormal phenomena), something that should be studied very carefully before anyone should be writing about questions of mind or consciousness. We get no mention of dendrites, no substantive mention of protein molecules, no mention of LTP or long-term potentiation, no mention of claims of engrams. We have on page 37 a false reference to "the fact that all living things are made of DNA." Physically, we are made of cells, and DNA is only one of countless components in cells.

We get in the book statements sounding like Chalmers has bought "hook, line and sinker" some of the most groundless boasts and ill-founded dogmas of modern scientists. He repeatedly refers to a groundless tenet that there is some "causal closure of the physical," that everything physical (such as human actions) can be explained by something else physical. Such a claim is a groundless dogma. On page 110 he seems to endorse such a dogma, making the incorrect claim that science tells us that "for every physical event, there is a physical sufficient cause." The claim that every physical event must have a physical cause is no more logically compelling than the claim that every Danish pastry must come from a Danish cook. What Chalmers advocates seems to be a "wolf in sheep's clothing" affair that he calls a dualism, but later reveals to be a "naturalistic dualism." It seems like basically something not much different from materialism. He claims that not everything is physical, but the way he presents such an idea, it seems there is no practical difference between what he is imagining and materialism, but merely a descriptive difference.

The reasoning that he gives for his position is some unconvincing reasoning based largely on some armchair argument involving "philosophical zombies." In the book Chalmers uses the word "zombies" 43 times. A "philosophical zombie" is some hypothetical entity having no conscious experience but acting just like a human. Arguments based on the possibility of "philosophical zombies" are misguided and fallacious. There is no reason to think that beings could act just like humans if such beings were not conscious.

To get some insight into the human mind, you should study in the greatest detail all of the varieties of human experiences, all of the strange things humans have reported seeing and experiencing, and all of the mental capabilities humans have seemed to have. A scholar of the mind should study and write about thousands or many hundreds of specific human beings and the specific capabilities and experiences they have had. Very little will be accomplished by avoiding specifics, and engaging in endless dry abstract philosophical talk about "consciousness," just as very little will be accomplished by a philosopher engaging in endless dry abstract philosophical talk about "existence." In Chalmers' book "The Conscious Mind" he uses the term "consciousness" 1,362 times, but seems to make very few references to specific humans and their specific experiences.

There are three main ways to start making some progress in the philosophy of mind:
(1) The first way is to do a thorough study of the human brain and its components, and the physical shortfalls of the human brain and its components, as well as a thorough critical study of neuroscience and the shortfalls and defective speech customs of current neuoscientists, including a study of their poor experimental practices and their frequent use of unproven dogmatic claims. Such a study should include an exhaustive inquiry into enigmatic case histories of neuroscience, and also a deep sociological study correctly categorizing neuroscientists as members of a modern belief community resembling an organized religion. Always be asking, "What kind of physical characteristics would a brain need to have if it were the source of our minds and the storage place of memories, and does the brain actually have such characteristics?" The person doing such a study will be likely to strongly suspect that "brains make minds" explanatory boasts of neuroscientists are mainly unfounded dogmas or belief community speech customs, rather than claims well-established by observations.
(2) The second way to start making some progress in the philosophy of mind is to make a very thorough study of the two hundred years of well-documented evidence for psychical phenomena and paranormal phenomena, which are of utmost relevance to topics in the philosophy of mind. This requires a very deep study of the specific experiences which particular humans have had.
(3) The third way to start making some progress in the philosophy of mind is to very deeply study biology, the vast order and organization of biological systems, the very many examples of cosmic fine-tuning that help make possible biological systems, and particularly the unsolved problem of the origin of the individual human body, something not explained by DNA, which does not specify anatomy, and does not specify the structure of any cell. A person properly studying such a topic will eventually learn that biologists currently have no credible explanation for the progression from a speck-sized zygote to

the vast organization of a human body. Such a failure is of the utmost relevance to the question of how there arises a human mind. If we need a top-down explanation for the origin of human bodies (as we do), that suggests we also need a top-down explanation for the origin of human minds, an explanation different from the bottom-up explanation of mere neural activity.

In his 1995 book Chalmers seemed to show few signs of having properly studied any of these topics to any great extent. He seemed to sound in that book rather like someone who hadn't properly studied brains and their components and their very many physical shortfalls and limitations, and hadn't properly studied the rich diversity of human mental experiences. His reasoning seems to be mainly armchair reasoning rather than the type of observation-based reasoning that should be the core of someone arguing about minds. This, alas, is what philosophers tend to do. Ignoring hundreds of extremely relevant observations that are of the utmost relevance to philosophical topics, observations requiring deep scholarly study, philosophers spend endless time discussing the armchair arguments of other philosophers.

Searching for Chalmers' work on Google Scholar, I find a draft of a book by him called *Constructing the World*, which talks endlessly about the mind, but fails to even use the words "neuron" or "neural" or "brain." This reinforces my impression of someone without much interest in diving very deeply into the low-level details of brains and neuroscience.

Chalmers wrote very much on mind-related problems during the 25 years following his 1995 Scientific American article. But in a 2018 paper, he sounded rather like he hadn't learned much about the shortfalls of neuroscience, the extreme overconfidence of neuroscientists, the physical limitations and shortfalls of the human brain, and the vast complexities of the human mind and human mental experience, a topic of oceanic depth. In a 2018 paper by Chalmers entitled "The Meta-Problem of Consciousness," we read this very erroneous statement:

"The hard problem of explaining phenomenal consciousness is one of the most puzzling in all of science and philosophy, and at the present time there are no solutions that command any sort of consensus. The hard problem contrasts with the easy problems of explaining various objective behavioural or cognitive functions such as learning, memory, perceptual integration, and verbal report. The easy problems are easy because we have a standard paradigm for explaining them."

What an erroneous statement that is at the end. Problems don't become easy because you have some simplistic "this explains everything" paradigm such as "it's all caused by neurons." When you have bad explanations for things, explanations that do not hold water, you have not made very hard problems "easy." And neuroscientists have nothing but bad explanations for "learning, memory, perceptual integration, and verbal report," explanations that do not hold water, for reasons discussed at great length in the posts on this blog. Part of the problem is that the brain bears no resemblance to a device for instantly storing memories, retaining learned information for decades, and allowing the instant retrieval of such information. From our work with computers, humans know the kind of characteristics that such a device would have; and the human brain has no such characteristics (as discussed here and here).

A position stated so often by Chalmers is one that makes no sense. It is the position that we can believe explaining things like learning and memory are "easy problems," because the neuroscientists claim some progress in understanding them, but that we must regard explaining consciousness as a "hard problem" because no progress has been made in solving it. But the neuroscientists have made just as many boasts about explaining consciousness as they have about explaining memory. So if our neuroscientists are not credible in their claims about having an explanation for consciousness, why should we think that they are credible about having an explanation for learning and memory? A very careful and impartial study of the claims of neuroscientists about having a neural explanation for learning and memory will reveal that they are as groundless as their claims of having an explanation for consciousness.

On page 5 of the document here, Chalmers states this:

"It is widely agreed that experience arises from a physical basis, but we have no good explanation of why and how it so arises. Why should physical processing give rise to a rich inner life at all? It seems objectively unreasonable that it should, and yet it does."

How very erroneous, to believe in something "objectively unreasonable," without having any "how" or "why," apparently because "it is widely agreed." Much better to get some idea of the mind that does not require you to believe in things "objectively unreasonable," no matter how much such an idea may defy the prevailing speech customs in academia.

I cannot claim to have well-studied Chalmers writings other than the few documents I have referred to, so who knows, maybe elsewhere there is some much better insight to be found in his writings, or much better scholarship on some of the topics I have mentioned. Indeed, a 2021 paper by him suggests he may be gaining some better insight. Some of the quotes I have made above may refer to one or more positions that Chalmers no longer holds.

To summarize, there are two gigantic mistakes involved in typical talk of a "hard problem of consciousness" when such talk cites Chalmers:
(1) Is it a huge mistake to be claiming that a problem of explaining consciousness is a "hard problem," and that the other problems of explaining human minds are "easy problems." Most of the other problems involved in explaining human minds are just as hard as the problem of explaining consciousness. If you think otherwise, you have probably failed to properly study the many physical shortfalls of the brain, and you have probably accepted without adequate critical scrutiny some unfounded explanatory boasts of neuroscientists that are not supported by robust evidence.
(2) Is it a huge mistake to be posing a "hard problem of consciousness" as a problem of "how does the brain give rise to consciousness?" We do not know that the brain does give rise to consciousness, and have very strong reasons (discussed in the posts of this site) for disbelieving that the main aspects of human mentality (such as consciousness and memory) can be explained as being caused by brains.

Reading the countless repetitions in writings by others of Chalmers' very faulty claim of a single "hard problem of consciousness," I sometimes ask myself:

why do people keep repeating reasoning so erroneous? I think the answer is that in such a claim we have a "the job is almost finished" legend, and people just love "the job is almost finished" legends, just as they love "light at the end of the tunnel" stories. We find a comparable "the job is almost finished" legend in the groundless boast that Darwinism has explained all biological origins except the origin of life. A more careful study may cause you to realize that such a boast is triumphalist baloney, and that neither the origin of any biologically innovative species nor the origin of any human body is plausibly explained by Darwinist theory (for reasons discussed here, here, here, here and here).

at January 16, 2023 No comments:

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Head Truth

The huge case for thinking minds do not come from brains

Monday, January 9, 2023

Study Finds No Robust Link Between Brain Structure and Personality

"You are your brain" is the nonsense that neuroscientists keep pushing. But the data tells us otherwise. Let's consider the important question of whether there is any robust link between brain structure and personality. This was the topic of a 2019 paper entitled "Empirical examination of the replicability of associations between brain structure and psychological variables." Reviewing previous studies, the paper says, "Our results revealed that among healthy individuals 1) finding an association between performance at standard psychological tests and brain morphology is relatively unlikely 2) significant associations, found using an exploratory approach, have overestimated effect sizes and 3) can hardly be replicated in an independent sample."

We read the following about an analysis on a data repository that included hundreds of brain scans and personality tests on the people being scanned:

"Kharabian Masouleh et al. have now used brain scans from hundreds of healthy volunteers from an already available dataset to try to resolve the issue. The volunteers had previously completed several psychological tests. These measured cognitive and behavioral aspects such as attention, memory, anxiety and personality traits. Kharabian Masouleh et al. performed more than 10,000 analyzes on their dataset to look for relationships between brain structure and psychological traits. But the results revealed very few statistically significant relationships. Moreover, the relationships that were identified proved difficult to replicate in independent samples.'

Oops, that's pretty much just we would expect if your brain has nothing to do with your personality. So why do we see all these studies claiming to link brain structure with personality? The paper suggests two answers: (1) a use of way-too-small study group sizes, and (2) publication bias, under which negative results go unreported.

It is well-known that these are two of the worst problems in experimental neuroscience. The paper suggests that "studies with 200 to 300 participants are still too small." But the typical neuroscience study does not even use 100 participants. Typically brain scan studies use fewer than twenty subjects, very often fewer than 15. With the type of way-too-small study group sizes used in most experimental neuroscience studies, what you are getting are probably merely false alarms and noise.

Publication bias is the well-known fact that scientific journals prefer to publish positive results: studies that report some real effect rather than just a null result. This means that studies reporting null results tend to go unpublished. In

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many cases experimenters getting a null result will not even bother to write up the results in the form of a scientific paper. That is called "the file drawer effect." So, to give a hypothetical example, suppose that 9 out of 10 researchers trying to find a link between merry cheerfulness and brain structure find no significant link. It could be that only the 1 in 10 researchers reporting such a link get published. The result in the literature is then misleading. Maybe you'll do a Google search for "brain structure and cheerfulness" and find only papers reporting a link, even though 9 out of 10 researchers failed to find such a link.

Referring to "structural brain behavior" or SBB associations, the authors report this:

"In particular we found a considerable number of SBB-associations that were counterintuitive in their directions (i.e., higher performance related to lower gray matter volume). Furthermore, subsampling revealed that for a given psychological score, negative correlations with GMV [gray matter volume] were as likely as positive correlations."

Such results are not surprising if you make the correct assumption that the brain is not the source of the human mind. The study says this:

"Our empirical investigation of the replicability of SBB [structural brain behavior] in healthy adults showed that significant associations between psychological phenotype [personality] and GMV [gray matter volume] are not frequent when probing a range of psychometric variables with an exploratory approach. Where significant associations were found, these associations showed a poor replicability...When looking at a range of psychological variables, significant associations with GMV [gray matter volume] were very rare."

The authors suggest that there is a lot of misrepresentation going on in neuroscience papers, under which authors misstate the effect size they found. Speaking foolishly and ungrammatically, the authors state "brain structure can certainly not be questioned as the primary substrates of behavior," which contradicts the data they have reported in the paper. That silly statement notwithstanding, they have produced quite a good paper showing the lack of evidence showing a link between brain structure and personality.

Vastly understating the gigantic dysfunction in experimental neuroscience, the authors state this:

"These findings suggest that samples consisting of ~200–300 participants have in reality still low power to identify reliable SBB-associations [structural brain behavior associations]among healthy participants. However, the sample size of SBB studies is usually substantially smaller. "

Substantially smaller? Figure 5 of the paper shows study group sizes used in neuroscience studies between 2001 and 2017, and shows an average of only about 15 participants. In rodent-based studies, we typically get "junk science" experiments involving fewer than 15 animals per study group. We read, "Our study pointed out the need for big data samples to identify robust associations between psychological variables and brain structure, with sample size of at least several hundreds of participants."

Head Truth

The huge case for thinking minds do not come from brains

Sunday, December 25, 2022

"Brains Make Minds" Models All Flunk a Large Brain Scan Study

There recently appeared a study attempting to measure how well different neuroscientist theories about intelligence performed when trying to predict intelligence from brain scans. The theories were all just minor variations of the idea that intelligence is purely a product of the brain. All of the neuroscience theories tested flunked this test very badly. But the press release announcing the study failed to mention this big flop, and merely gave us a headline announcing that one of the theories performed better than the others.

The study was entitled "Investigating cognitive neuroscience theories of human intelligence: A connectome-based predictive modeling approach." The study used a surprisingly high number of subjects, about 300. In this respect the study was very different from the great majority of experimental neuroscience studies using brain scanning, which routinely use way too-small study group sizes. Nowadays experimental neuroscience studies mostly display an appalling failure to follow sensible standards. There is no standard being used for the minimum number of subjects that must be used. The great majority of published experimental neuroscience studies are junk science studies that use way too-small study group sizes, typically fewer than 15 subjects per study group. The results reported in such studies are mainly noise and false alarms. Do not ever make the very large mistake of assuming that an experimental neuroscience study must have been good science if it passed peer review and got published in a major science journal. Nowadays peer reviewers are letting all kinds of junk studies and poorly designed research get published in leading neuroscience journals. The peer reviewers of neuroscience journals are typically scientists who themselves wrote papers using Questionable Research Practices such as a lack of a blinding protocol, unreliable techniques for measuring animal fear, and way-too-small study group sizes. Such peer reviewers are reluctant to exclude papers for committing the same sins that were committed in the papers authored by the peer reviewers themselves. It's kind of like a situation in which tax cheaters who cheat on their taxes every year are in charge of auditing tax returns by other people.

In the study "Investigating cognitive neuroscience theories of human intelligence: A connectome-based predictive modeling approach" about 300 subjects were given a large variety of cognitive tests. The same subjects had their brains scanned. From features detected in brains, a group of neuroscience theories were used to make predictions about how well the subjects should have performed in intelligence tests. Graphs were created showing how well these predictions matched reality.

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- Cases of High Mental Function Despite Large Brain Damage
- Reasons for Doubting a Brain Could Do the Super-Complex Encoding Needed to Neurally Store Episodic Memories or Concepts
- The Promissory Notes of Materialist Professors Are Long Past Due
- Study Finds No Correlation Between Number of Neurons and IQ
- The Many Cases Showing a Person's Mind Can Operate When His Brain Has Shut Down

The neuroscience theories tested against reality included the following:

(1) A "lateral PFC" theory assuming that intelligence mainly comes from the prefrontal cortex.

(2) A "Parieto-Frontal Integration" theory that "proposes that connectivity of a distributed frontoparietal network accounts for intelligence by enabling the integration of knowledge between frontal and parietal areas to support hypothesis generation and problem solving."

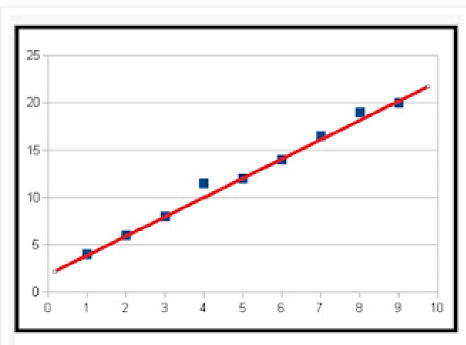
(3) A "Multiple Demand" theory that "incorporates more recent advances in understanding the network architecture of general intelligence by appealing to an even broader network of frontoparietal and cinguloopercular regions."

(4) A "Process Demand" theory that "provides a novel framework centered on the idea that general intelligence reflects the engagement of multiple cognitive processes represented by the overlap (or shared connections) among brain networks."

(5) A "Network Neuroscience" theory that proposes that intelligence "emerges from individual differences in the network topology and dynamics of the human connectome."

The paper has some graphs showing how well these theories predicted intelligence. We get two main types of graphs: scatter plot graphs and correlation graphs shown as bar graphs.

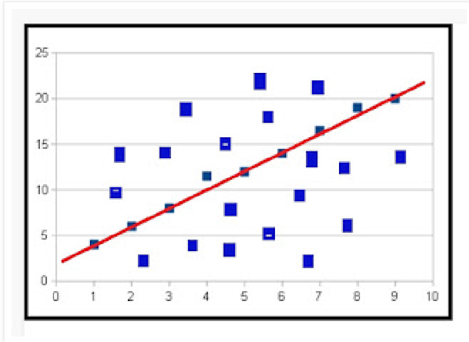
Before discussing the results, I must give a little primer on scatter plot graphs involving correlation. A scatter plot shows data items for which two numbers have been collected. For example, if you kept track of how much ice cream was sold on a store, while recording the temperature of each day, you could make a nice scatter plot comparing sales on the different days, and the temperature on each day; and you would see a nice correlation between hot weather and ice cream sales. When there is a strong correlation, a scatter plot will look something like the graph below, showing a very clear correlation:



Graph 1: A scatter plot showing high correlation

When there is very little or no correlation, a scatter plot will look something like the graph below, with the points scattered all over the graph, with the points showing no very clear line:

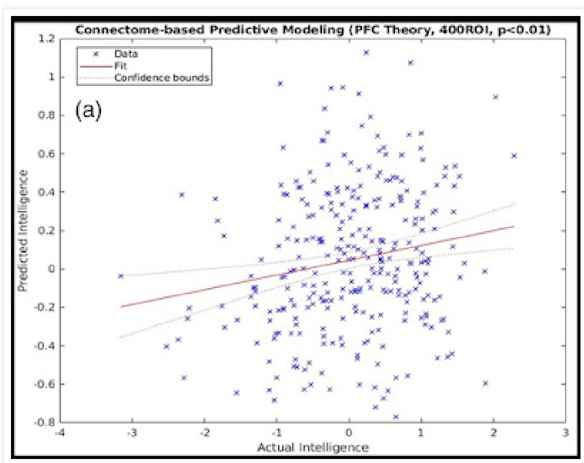
- A Soul Might Explain Instincts, but DNA and Brains Cannot
- Five Hallmarks of an Information Storage System (None of Which Your Synapses Have)
- Your Physical Structure Did Not Arise Bottom-Up, So Why Think Your Mind Did?
- Why a "Mechanical Memory" Theory Does Not Work
- The Brain Seems to Have No Mechanism for Reading or Writing Memories
- No One Understands How a Brain Could Generate Ideas
- Prevailing Brain Dogmas Cannot Explain Hypnotic Phenomena
- 30 Reasons for Rejecting the Theory of Neural Memory Storage
- Common Experiences That Show the Untruth of Professorial Memory Claims
- Neuroscience Research Customs Guarantee an Abundance of Junk Science
- Groupthink and Peer Pressure Make It Taboo for Neuroscientists to Put Two and Two Together
- The Social Construction of Eager Community Mirages
- Preprint Server Counts Suggest Engrams Are Not Really Science
- Engrams Are Touted Like Phlogiston Was Once Touted
- Synaptic Delays Mean Brain Signals Must Move at a Snail's Pace
- Raven Smarts Defy Prevailing Brain Dogmas
- No One Can Credibly Explain Why a Brain Would Store a Memory in One Specific Spot
- Brain Dogmas Versus Case Histories That Refute Them
- Inaccurate Titles and Misleading Citations Are Common in Science Papers
- In Neuroscience Papers Bluffing Is More Common Than Candor
- Young Age of Languages Contradicts Claims of Neural Storage of Linguistic Information
- Vacillating Disarray of the Memory Trace Theorists
- Study Finds "Poor Overall Reliability" of Brain Scanning Studies
- "Brains Store Memories" Dogma Versus the Reality of Noisy Brains
- The Brain Has Nothing Like 7 Things a Computer Uses to Store and Retrieve Information



Graph 2: A scatter plot showing little or no correlation

The study "Investigating cognitive neuroscience theories of human intelligence: A connectome-based predictive modeling approach" has some scatter plots showing how well the various "brains make minds" models performed. The scatter plots all look like Graph 2 above, and show the models flunking the test by performing very poorly at predicting intelligence.

Figure 4 of the paper shows the scatter plot below, where we see a failure of the "lateral PFC" model to perform impressively, without any clear trend line:



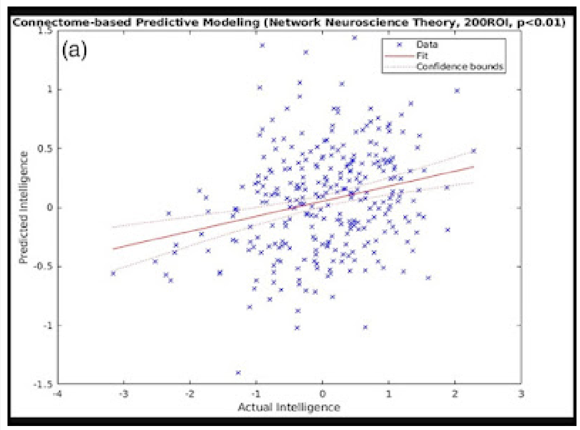
A bar graph next to this graph shows us that the predictive performance is dismal, with the performance seeming to be worst than what we would expect from mere guessing. Figure 5 of the paper looks like the scatter plot shown above, and shows very bad predictive performance of the "Parieto-Frontal Integration" theory, with no clear trend line. Figure 6 of the paper looks like the scatter plot shown above, and shows very bad predictive performance of the "Multiple Demand" theory, with no clear trend line.

Discussing the "Process Overlap" theory, the paper tells us that "we find evidence that whole-brain functional edges do a relatively poor job at predicting *g* [intelligence] compared with other connectivity profiles, with the best-performing model (Figure **7a**) generating predictions of $r = .11$." The r is a measurement of correlation, which can vary from $r = 0$ (no correlation) to $r = 1$ (perfect correlation). A correlation of only .11 is a negligible correlation. As a general rule of thumb, there is no good evidence of a causal relation unless you find some r value greater than .3, and the evidence for a relation is weak unless the r value is .5 or greater.

Finally the paper comes to displaying the performance of the theory that supposedly produces "the most robust predictions of general intelligence" of

- Exhibit A Suggesting Scientists Don't Understand How a Brain Could Store a Memory
- The Dubious Dogma That Brains Make Decisions
- Long Article Tries to Show Neural Memory Storage, but Gives No Real Evidence for It
- How Evidence for ESP Undermines the “Minds Come From Brains” Dogma
- Gender Differences in Brains Help Discredit Prevailing Dogmas About Brains
- Study Finds Equal Brain Connectivity in All Mammals
- Some Reasons the Main Theory of Neural Memory Storage Is Unbelievable
- Scientists Can't Persuasively Explain How a Brain Could Instantly Retrieve a Memory
- The Lack of Evidence for Memory-Storage Engram Cells
- Candid Confessions of the Cognitive Experts
- Global Workspace Theory Sure Isn't an Explanation for Consciousness
- When Animals Cast Doubt on Dogmas About Brains
- Memories Can Form Many Times Faster Than the Speed of Synapse Strengthening
- The Guy with the Smallest Brain Had the Highest IQ
- He Had Half a Brain and Above Normal Intelligence
- The Truth About Neurons and Synapses
- A Diagram of Explanatory Dysfunction in Academia
- The Brain Shows No Sign of Working Harder During Thinking or Recall
- More Evidence of High Mental Function Despite Large Brain Damage
- The Lack of a Viable Theory of Neural Memory Encoding
- More Evidence That Neuron Loss Has Little Effect on Cognition
- Fraud and Misconduct Are Not Very Rare in Biology
- Reasons for Doubting Thought Comes from the Frontal Lobes or Prefrontal Cortex
- Why Most Animal Memory Experiments Tell Us Nothing About Human Memory
- Other Evidence of Human Paranormal Abilities

the theories: the "Network Neuroscience" theory. Unfortunately, the performance of this "best of the lot" winner is dismal. Figure 11 of the paper gives us this scatter plot showing the performance of this "Network Neuroscience" theory:



Again, we see a scatter plot failing to show any clear trend line. The bar graph included with this scatter plot further clarifies how badly the "Network Neuroscience" theory performs. In that bar graph we see that with most versions of the theory, the correlation level is actually less than 0, with a negative correlation. That equals worst results than you would get from random guessing or throwing a dice.

The end of the "Investigating cognitive neuroscience theories of human intelligence: A connectome-based predictive modeling approach" fails to accurately characterize these extremely poor results from all of the models. We read multiple times a totally unjustified use of the phrase "reliable predictions of g [intelligence]" that does not match any of the graphs shown. The paper should have had a conclusion section mentioning the abysmal predictive failure of all of the models tested. Instead the paper ends with some unjustified language contradicting the data it displays. It's as if the authors failed to study their own graphs, or failed to accurately describe them. This is what happens very frequently in today's neuroscience literature: authors making claims (particularly in paper titles and paper abstracts) that do not match the data they have collected. The very marginal and very weak association between cognitive scores and brains shown by a small subset of the data can easily be explained by factors having nothing to do with intelligence, because brain differences can cause things such as differences in perceptual ability, differences in muscle speed, and differences in manual dexterity, all of which can affect IQ test scores.

The press release of the study gives us this headline: "Study: Network neuroscience theory best predictor of intelligence." An accurate headline would have been this: "Models Assuming Brain-Based Intelligence All Flunk a Large Brain Scan Test." The reported results are quite consistent with the idea that your brain does not make your mind. The press release basically does a cover-up job, by failing to mention the very bad predictive performance of all of the theories.

We hear quotes from a neuroscientist who fails to mention the very bad failure of all of the "brains make minds" theories when predicting intelligence from brain scans. Instead the neuroscientist gives us a little empty hand-waving by trying to explain problem-solving by mentioning "connections." A connection of brain cells does nothing to explain problem solving or intelligence. We know of countless highly-connected things that are utterly mindless, like the atoms in a crystal lattice. The paper I have discussed suggests there is no robust correlation between brain connections and intelligence.

The result should come as no surprise, as it matches a previous study of brain connectivity. The study was announced on the Science Daily web site with this headline: "MRI scans of the brains of 130 mammals, including humans, indicate equal connectivity."

We read the following:

"Researchers at Tel Aviv University, led by Prof. Yaniv Assaf of the School of Neurobiology, Biochemistry and Biophysics and the Sagol School of Neuroscience and Prof. Yossi Yovel of the School of Zoology, the Sagol School of Neuroscience, and the Steinhardt Museum of Natural History, conducted a first-of-its-kind study designed to investigate brain connectivity in 130 mammalian species. The intriguing results, contradicting widespread conjectures, revealed that brain connectivity levels are equal in all mammals, including humans."

at December 25, 2022 No comments:

Labels: brain connectivity, network neuroscience theory, predicting intelligence from brains, prefrontal cortex

Sunday, December 18, 2022

This Year's Paltry Neuroscience Progress Is What We Would Expect If Brains Don't Make Minds

The amount of progress that neuroscientists make each year should very much depend on whether the dogmas of neuroscientists are true. Given our current very high degree of technology we would expect two possible results:

- If brains do store memories, and brains do make minds, we would expect that given all of our wonderful technology and high funding for neuroscience research, that each year would produce wonderful progress in neuroscience, with there occurring various dramatic events such as the discovery of a memory storage code in brains or the reading of memories from the brains of dead men or neuroscientist research clarifying how a brain is able to instantly retrieve a memory.
- If brains do not store memories, and brains do not make minds, we would expect that despite all of our wonderful technology each year would produce little neuroscience progress, and that most of the news reports sounding like big progress in neuroscience would be unfounded reports based on groundless hype and illusion.

A recent article in Scientific American unintentionally suggests that the second of these situations is what is actually occurring. It is an article entitled "This Year’s Most Thought-Provoking Brain Discoveries." After noting the lack of progress in understanding how a brain could produce consciousness, and noting that such an understanding "may not be forthcoming for decades, if ever," the article gives a list of what the author judges to be the top four advances in neuroscience reported in Scientific American in 2022.

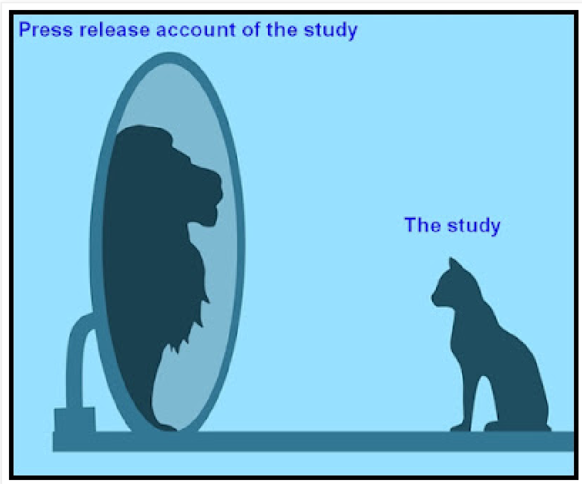
As Discovery #1 the article lists the groundless claim that "your brain has a thumbs up-thumbs down switch." We have a credulous discussion of some poorly-designed experimental research guilty of the Questionable Research Practices so very prevalent these days in experimental neuroscience. We are told that this year someone "co-authored a *Nature* paper that reported on a kind of molecular switch in rodents that flags an experience as either good or bad." We get a reference to a Scientific American article with the unfounded title "Newfound Brain Switch Labels Experiences as Good or Bad." In that paper we have a reference to the study "Neurotensin orchestrates valence assignment in the amygdala." It's yet another appalling example of the ridiculously bad experimental practices being followed these days in neuroscience.

The study group sizes used were too small for any convincing result. In Figure 1 of the paper we read of study group sizes of 18, 17, 11, 9, 15, 13, 14, 12, 8, 9, 8 and 9. In Figure 2 we read of study group sizes of 17, 19, 14, 14, 7, 8, 7 and 8. In Figure 3 we read of study group sizes of only 13, 12, 13, 12, 5 and 5. In Figure 5 we read of study group sizes of only 12 and 14. Fifteen subjects per study group is the absolute minimum for any type of slightly impressive result in a study such as this, with a much larger study group size (possibly many times larger) being necessary for many types of experimental studies. As a good general rule of thumb, any correlation-seeking experimental study using fewer than 15 subjects in any of its study groups should be regarded as probably mere junk science.

The scientists would have discovered that the study group sizes used were way too small to produce a reliable result, if they had acted like good scientists and had done what is called a sample size calculation. That's a calculation in which you determine how many subjects you need to use to get a statistically robust result. Alas, in the paper the scientists confess that no such calculation was done. They say "sample sizes were not predetermined and based on similar studies in the literature." This is what happens most of the times these days in the massively dysfunctional swamp that is experimental neuroscience. Most experimental neuroscientists are using way-too-small sample sizes (the same as study group sizes), and feebly trying to justify the study group sizes they used by saying that they were "based on similar studies in the literature." But when extremely bad habits are prevalent in a research community, you do not justify your bad behavior by noting that you acted as your fellow experimental neuroscientists acted. That is like some student spending only five minutes on his homework and saying, "I spent an amount of time on my homework similar to what my friends spent."

The study hinged upon claims of "freezing behavior" in rodents, making 27 uses of the word "freezing." This is a senseless practice widespread in experimental neuroscience. In countless papers mere subjectively judged non-movement of a rodent is called "freezing behavior," and is claimed as evidence of fear. The non-movement of a rodent is not good evidence for fear. The only reliable way to measure fear in a rodent is to measure heart rate, which very sharply spikes when a rodent is afraid. Today's neuroscientists avoid making reliable measurements of fear in rodents by heart rate measurements, and instead cling to a senseless habit in their research community of trying to judge fear by making subjective judgments about whether a rodent stopped moving. We may wonder whether the reason for this absurd practice is that it allows neuroscientists to claim seeing fear in an animal whenever they want to see it, which makes it easier for them to report getting positive results.

The Scientific American article claim that "a brain switch labels experiences as good or bad" does not even match any claim made by the scientific paper. It's just a piece of science journalist sensationalist fluff, and the paper that it is based on did not follow good research practices, and provides no robust evidence for anything of the sort. So the first item on Scientific American's "best neuroscience of the year" list does not hold up to scrutiny.



Discovery #2 in Scientific American's article "This Year's Most Thought-Provoking Brain Discoveries" is no discovery about the brain. The discovery is listed as this: "Investigators found that innate expressions grounded in biology do not exist—and instead are highly variable." That isn't a brain discovery.

Discovery #3 in Scientific American's article "This Year's Most Thought-Provoking Brain Discoveries" is also no discovery about the brain. The discovery is listed as this:

"Many kids are psychological mixes, mosaics, studies showed this past year. They display sensitivity to some but not all influences around them, depending on a particular situation."

That's not a brain discovery, and not even a discovery at all, because people have known such a thing for centuries.

Discovery #4 in Scientific American's article "This Year's Most Thought-Provoking Brain Discoveries" is also no discovery about the brain. The discovery is described like this:

"Kids at five Virginia high schools took courses, and their performance was matched against another group that received lessons without the spatial-learning component. The results of the research, published in August, showed that students in the spatial learning group improved not only spatial skills but also verbal abilities—figuring out a problem using words."

Yes, children continually improve their vocabulary as they take courses in schools. That has been known for centuries. That isn't a discovery about the brain.

What we have in Scientific American's roundup of the "most thought-provoking brain discoveries" of 2022 is just the kind of meager, paltry, unimpressive results we might expect if your brain does not produce your mind, and your brain does not store your memories. Similarly, if there was some well-funded society consisting of researchers believing that the moon

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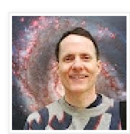

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causes you to fall in love, we might expect that this year's best research results from such a society would be some paltry, meager, unimpressive results. Erroneous assumptions tend to yield unimpressive research results, although hype, exaggeration, distortion, and misleading press accounts may tend to cover up the shortfall. If your brain does not make your mind and does not store your memories, we would expect neuroscientists to be producing nothing very exciting in their research (although hype and exaggeration might make you think otherwise). So it's no surprise that a story today in *The Guardian* is entitled "The 10 biggest science stories of 2022 – chosen by scientists," and that not one of the stories involves neuroscience research.

at December 18, 2022 No comments:

Saturday, December 10, 2022

30 Things That Would Never Occur If Prevailing Neuroscientist Dogmas Were True

Let us look at some things that we should never expect to occur if the prevailing dogmas of neuroscientists were true, but which do actually occur.

Item # 1: Instant Memory Formation

The simple fact that humans can form complex new memories instantly is incompatible with the claim of neuroscientists that memories form by "synapse strengthening" or by the "alteration of neural connection patterns." If that were how humans formed memories, then the formation of a new memory would be a very sluggish affair, requiring many minutes or hours. "Synapse strengthening" or the "alteration of neural connection patterns" would require the synthesis of new proteins, which takes quite a few minutes or hours. But it is a very obvious fact of human experience that humans can form permanent new memories instantly. For example, you don't need to see a movie three or four times before being able to describe its plot exactly. You can tell someone the plot of a movie days after you have seen it the first time, even if you never thought of the movie during the days following your first viewing of it. And if someone fires a gun near your head, it won't take minutes for you to form a permanent new memory of this event; you'll get such a memory instantly.

The discrepancy between reality and neuroscience dogma is shown by the repeated occurrence of absurd lies in neuroscience literature in which it is claimed that forming a long-term memory requires "hours or days." For example, one recent neuroscience paper claims, "The initial process of long-term memory formation...occurs on a time-scale of hours to days." Nonsense; each of us can form permanent new memories instantly. New York City residents my age didn't need "hours or days" to form a permanent new memory of the fact that one of the World Trade Center towers had fallen. We got a permanent new memory of the fact the instant we heard it.

Item # 2: Instant Memory Recall

Let's consider a simple case. You hear the name of a movie star. You then instantly recall what that person looks like, and see a faint image of that person in your “mind's eye.” But how could this ever happen, if the memory of that person is stored in some particular part of your brain? In such a case, you would need to know or find the exact place in the brain where that memory was stored. But there would be no way for your brain to do such a thing. It would be like trying to find one particular needle in a skyscraper-sized stack of needles. Exactly the same problem arises in trying to explain how a person could recall a sentence of relevant information when given a one-word prompt, as in these cases:

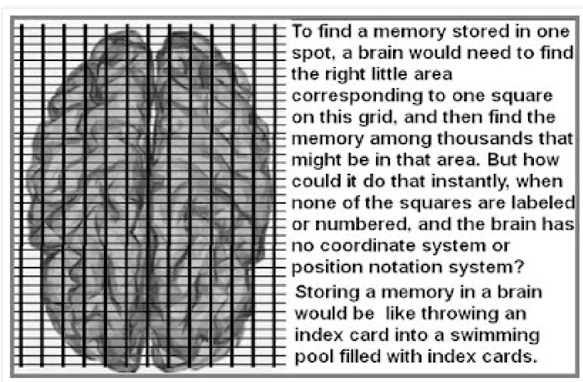
John: *Waterloo?*

Jane: *That was the final battle bought by the French emperor Napoleon Bonaparte, in which he was defeated.*

John: *Dickens?*

Jane*: Charles Dickens was a very popular 19th century British novelist who wrote classics such as "David Copperfield," "Oliver Twist," and "A Christmas Carol."*

Such common cases of instant memory recall should be impossible if memory is being retrieved from the brain. Humans know from their experience with books and computers what things are needed to allow instant retrieval to occur from physical systems. They are things such as addressing, sorting and indexing. No such things exist in the brain. Neither brain cells nor synapses have any type of addressing or indexing that might make possible instant recall.



Item #3: Telepathy Outside of the Laboratory

The existence of telepathy outside of the laboratory is an extremely common human experience that would be recognized by many times more people were it not for the fact that materialist scientists have senselessly discouraged people from testing such an ability using their own families and friends. Researcher Louisa Rhine documented very many cases of telepathy outside of laboratory settings, in her book *Hidden Channels of the Mind*, which may be read here. Sally Rhine Feather documented very many other cases of telepathy outside of laboratory settings, in her book *The Gift: ESP, the Extraordinary Experiences of Ordinary People*, which can be read here. I personally have had many dramatic experiences showing the reality of telepathy, which I describe in posts such as this post and this post. Every case of telepathy is utterly incompatible with the prevailing dogmas of neuroscientists. If your brain is what is making your mind (or the same thing as your mind), telepathy should be impossible. The utter incompatibility of such claims about the brain and reports of telepathy are why neuroscientists senselessly refuse to acknowledge nearly two hundred years of massive evidence for telepathy.

Item #4: Out-of-Body Experiences

Labels

Out-of-body experiences are a perfect example of an experience no one should ever have if prevailing neuroscientist dogmas were true. In an out-of-body experience someone reports being outside of his body. In a large fraction of all out-of-body experiences, a person reports observing his body from some position one meter or more away from his body. Such experiences simply should not occur if your brain is the same as your mind, or if your brain was creating your mind. Under such dogmas, a person should be permanently trapped in his body, and should never be able to observe his body from outside of his body. Instead of never occurring as predicted by prevailing neuroscience dogmas, out-of-body experiences are quite common. A scientific survey of a group of hospital patients found that 10% of patients with cardiac arrest had a near-death experience (NDE), with 19 of these 27 patients who reported an NDE reporting an out-of-body experience (OBE). A different study found that "Of the 30 interviewable survivors of cardiac arrest, 7 (23 percent) described experiences classified as NDEs by scoring 7 or more points on the NDE Scale." Of these reporting a near-death experience in this study (11), 90% reported out-of-body experiences. A Dutch study found 18% of cardiac arrest survivors reporting a near-death experience, but with only a minority of these reporting an out-of-body experience.

Item #5: The Recitation of Very Large Bodies of Memorized Information

A person familiar with common theatrical productions will know of some cases in which people memorize very large bodies of information. For example, to play the role of Hamlet, an actor must memorize 1,422 lines, and to play the role of Richard III, an actor must memorize 1,124 lines. Similar demands on memory are made by the Wagnerian singing roles of Tristan and Siegfried, the latter requiring a singer to sing for most of three solid hours. But such well-known feats of memory recall are dwarfed by various lesser-known examples. According to the site of the Guinness Book of World Records, Rajveer Meena memorized pi to 70,000 digits, reciting those 70,000 digits without any errors. Lu Chao memorized pi to 67,000 digits. Below is a quote from page 53 of the book *The Mind and Beyond* published by Time-Life Books:

"As reported in the 1990 edition of the Guinness Book of World Records, in 1967, one Mehmed Ali Halici of Turkey recited from memory 6,666 verses of the Koran in six hours. And in 1989, Englishman Tony Power memorized in correct order a random sequence of thirteen packs of shuffled playing cards – 676 cards in all – after looking at them only once. But the world record for a single eidetic memory feat may be held by Bhandanta Vicitasara of Rangoon, Burma who in 1974 correctly recited from memory 16,000 pages of Buddhist canonical texts."

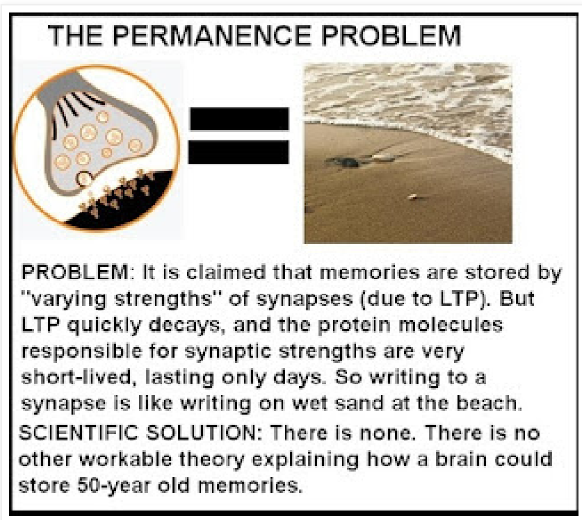
All such feats should be impossible if memory recall occurred by retrieving information from brains. The brain is lacking in anything that can explain the recall of very large bodies of sequential information. Consider the arrangement of neurons. The average neuron has thousands of connections to other neurons. With such an arrangement, there should be no way for sequential memorization to occur. There is no physical ordering that would allow a progression from one neuron to the next neuron, with the progression always occurring the same way through the same series of thousands of neurons. For a particular neuron, there is no "next" neuron or "previous" neuron, but instead thousands of connected neurons. Such an organization should make sequential

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

memory access impossible. The point is explained in my post "Why Brains Are Not Suitable for Storing Long Sequences Like Humans Remember."

Item #6: The Detailed Recall of Things People Experienced Decades Ago

My post "Why We Should Not Think the Human Brain Can Store Very Old Memories" explains why the simple fact of humans remembering things for decades is inexplicable under prevailing neuroscience dogmas. Neuroscientists lack any credible explanation for either memory storage or the persistence of memories for decades. Trying to make it sound a little like they have some idea of how memory physically works, neuroscientists use the deceptive term "long term potentiation" (LTP), which actually refers to a very short-term effect that typically lasts only days, and has never been proven to last for years. The prevailing dogma is that memories are stored in synapses, a ridiculous claim given the fact that the average lifetime of synapse proteins is known to be less than two weeks, a length of time 1000 times shorter than the maximum time humans can remember things (50 years or more).



Item #7: Clairvoyance

We have nearly two hundred years of written evidence for clairvoyance, much of it written by distinguished physicians and scientists. There are various types of clairvoyance. Spontaneous clairvoyance may occur when someone reports the approach of an unexpected unseen visitor who very soon arrives at her doorstep. Some examples can be found here. Nineteenth century literature on hypnotism contains many accounts of people under hypnosis who (when guided on a kind of mental journey by someone familiar with a place) could correctly list all kinds of details of places they had never physically seen. Some examples of this effect (called traveling clairvoyance) can be found here, here, and here. What can be called *"X-Ray" Clairvoyance* involves things such as the ability to correctly read through heavy blindfolds, or to correctly describe the contents of sealed letters and closed boxes, or to see within a human body. Some examples can be found here, here and here. As discussed here and here, research into remote viewing (a modern term for clairvoyance) was long funded by the US government, with many successes reported. The phenomenon of clairvoyance cannot at all be explained within the framework of prevailing neuroscience dogmas.

Item #8: Hypnotic Insensitivity to Pain

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

See the "Phenomenon #2" section of this post for a discussion. The main relevant work on this is the book here by Dr. James Esdaile, who reported that hundreds of major operations occurred in India under his supervision, involving subjects who had no anesthesia but reported no pain during amputations or removals of large tumors, because they had been told to feel no pain while hypnotized. Another book documenting the same thing is the book "Numerous cases of surgical operations without pain in the mesmeric state" by John Elliotson MD, which can be read here. Such accounts are incompatible with the dogma that the mind is the product of the brain. If such a dogma were true, we would expect that severe pain could only be stopped by physical interventions (such as taking drugs or injections or ice-freezing a body spot were pains come from).

Item #9: Hypnosis at a Distance or Telepathic Knockouts

A phenomenon in which a hypnotist can induce a trance in an unseen person is reported here and here. On the page here we are told, "In 18 of 25 trials Janet and his colleague Gilbert were able to induce a trance in their hysterical subject Leonie at distances varying from 1/4 to 1 mile." The page here tells us the experiments of L. Vasiliev at the University of Leningrad were overwhelmingly successful in producing trances at a distance in subjects, with a 90% success rate, with most of the people trying to produce the trances being in different rooms, and the trance almost always occurring within a few minutes of the remote attempt to make the person entranced. No such phenomenon should be possible if brains are the cause of human minds.

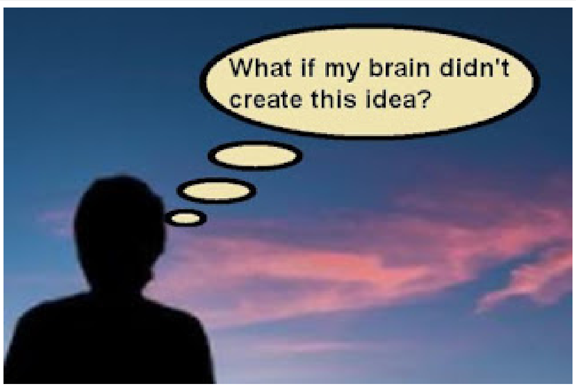
Item #10: Anomalous Sensation Phenomena

It has been very frequently reported that a hypnotized person may instantly feel sensations felt by the person who hypnotized him. A set of experiments on this effect is reported in the "First Report of the Committee on Mesmerism" pages 225-229 of Volume 1 of the Proceedings of the Society for Psychical Research (April, 1883), a committee including the illustrious names of Frederic Myers, Edmund Gurney, Frank Podmore, George Wyld M.D. and the eventually knighted physicist W.F. Barrett. We read this on page 226: "Thus out of a total of 24 experiments in transference of pains, the exact spot was correctly indicated by the subject no less than 20 times." Similar results were obtained by Dr. Edmund Gurney and reported in his paper "An Account of Some Experiments in Mesmerism," published on page 201 of Volume II of the Proceedings of the Society for Psychical Research (June 1884). As reported on page 205, a hypnotized subject identified with high accuracy tactile and taste sensations occurring in a hypnotizer sitting behind him.

Mirror touch synsethesia is a rare effect by which non-hypnotized people seem to feel tactile sensations of nearby people. The phenomenon is so well-documented that it is not even disputed by some who claim to be skeptical of all paranormal phenomena. A search for "phantom limb pain" will find many matches in mainstream sources, including assertions that most amputees experience such pain (mysteriously arising as if the amputed limb still existed). Such experiences should not occur if the mind is merely the product of the brain, but are compatible with ideas such as the idea that you have a soul that may have sensitivity protruding outside of your body, sensitivity that may be increased under hypnosis.

Item #11: The Production of Abstract Ideas

Neuroscientists have no credible tale to tell of how a human could create any abstract idea. In my post "No One Understands How a Brain Could Generate Ideas," I review the miserably bad answers experts give on two expert answer sites when asked how a brain could generate an idea. Humans are capable of building machines that can retrieve information, by using some things that are unlike anything found in the brain: things such as addressing, sorting and indexing. But humans have never built any kind of machine or device capable of generating ideas. You can built a computer program that combines words, and call that an "idea generator," but the term would not be accurate. What the program would generate is merely word combinations, not ideas. Ideas would only arise when a human being read the word combinations. No one has idea of how a human-made device could ever generate ideas. Since ideas are immaterial things, the production of ideas from a material thing seems no more credible than the idea you might squeeze a rock and get it to pour forth blood.



Item #12: Near-Death Experiences, Particularly Veridical Ones

A veridical near-death out-of-body experience is when someone having a close encounter with death reports moving out of his body, and is able to recall observational details that are later verified, details that should have been impossible for the possible to have learned. Some compelling examples can be found here. Examples include patients who reported floating out of their bodies and reporting things on either the roof of the hospital or in floors above them, things they had no opportunity to discover with their ordinary senses. Near-death experiences of this type completely defeat attempts to explain near-death experiences as hallucinations. In general, there is no explanation for dramatic near-death experiences within the framework of prevailing neuroscience dogmas. Such experiences often are lengthy experiences occurring during cardiac arrest, and the brain very quickly flatlines within a few seconds after cardiac arrest, meaning no neural explanations of such events are credible.

Item #13: Apparition Sightings, Particularly Crisis Apparitions

Volume One of the massive two volume work *Phantasms of the Living* by Edmund Gurney, Frederic Myers and Frank Podmore can be read online here, and Volume Two of the work can be read here. A significant fraction of the 700+ cases reported in that two-volume work are cases in which someone reports seeing or hearing an apparition of a particular person they did not know was dead, only to find out later that just such a person had died on about the same day or exactly the same day (and often on the same hour and day). I have described hundreds of such cases in the series of posts you can read below, which contain many other cases of such "crisis apparitions":

An Apparition Was Their Death Notice

25 Who Were "Ghost-Told" of a Death

25 More Who Were "Ghost-Told" of a Death

Yet Another 25 Who Were “Ghost-Told” of a Death

Scientific American's Very Lame "Ghost Explanations"

They Also Were "Ghost Told" of a Death

More Accounts of Veridical Apparitions

Even More Cases of Veridical Apparitions

When Apparitions Serve as Announcements

Still More Cases of Veridical Apparitions

When Apparitions Act as News Bulletins

They Too Were "Ghost-Told" of a Death

They Seemed to Ghost-Learn of Someone's Death

It Seemed Her Suicide Was Not Her End

When Crisis Appartions Seem to Notify of Someone's Death

Under prevailing neuroscience dogmas the only way to explain a case of this type is to assume a double coincidence: that someone coincidentally happened to have a hallucination (usually the first hallucination of his life) involving seeing a person who had died somewhere else at about the same time the hallucination occurred. Such double coincidences should be very rare, happening to far fewer than one person in a million. But since the number of reports of crisis apparitions of this type are high, we cannot credibly explain them all by some theory involving a double coincidence that should almost never occur.

Item #14: Sightings of the Same Apparitions by Multiple Witnesses

In seven previous posts I discussed cases in which multiple witnesses reported seeing the same apparition. The seven posts are below:

When an Apparition Is Seen by Multiple Observers: 17 Cases
When an Apparition Is Seen by Multiple Observers: 17 More Cases
More Apparitions Seen by Multiple Observers
Many an Apparition Is Seen by More Than One
Still More Apparitions Seen by Multiple Observers

When an Apparition Is Seen by Not Just One
When Two or More See the Same Apparition

I can quote Edward W. Cox on why such cases are not credibly explained by explanations of neural hallucinations. Cox wrote this:

"*"But, if precisely the same form was seen by two persons at the same place at the same time, we have evidence, and very cogent evidence, of the actual existence of such an object, by reason of the extreme improbability that the identical hallucination should arise in two minds at the same moment. If three or more persons beheld the same object at the same time, the proof amounts almost to demonstration, for the chances against such a concurrence of mental actions are as infinity to one."*

Item #15: Terminal Lucidity

Terminal lucidity occurs when someone who had long suffered from dementia suddenly seems to return to a normal, lucid state of mind just before dying. An example can be read on this page and the next page. On page 410 of the book *Irreducible Mind* we read this:

"Myers (1892b) had referred to the 'sudden revivals of memory or faculty in dying persons' (p.316)...The eminent physician Benjamin Rush...observed that 'most of mad people discover a greater or less degree of reason in the last days or hours of their lives' (p. 257). Similarly, in his classic study of hallucinations, Brierre de Boismont (1859) noted that 'at the approach of death we observed that ... the intellect, which may have been obscured or extinguished during many years, is again restored in all its integrity' (p. 236). Flournoy (1903, p. 48) mentioned that French psychiatrists had recently published cases of mentally ill persons who showed sudden improvements in their condition shortly before death. In more recent years, Osis (1961) reported two cases, 'one of severe schizophrenia and one of senility, [in which] the patients regained normal mentality shortly before death' (p. 24)."

No such thing as terminal lucidity should occur if your brain was producing your mind. Once a mind-producing brain had deteriorated, such a deterioration would be irreversible. A brain producing a mind would no more suddenly restore itself than a book missing many of its pages would suddenly restore such pages.

Item #16: Very High Mental Function Despite Very Heavy Brain Damage

The theory that your brain produces your mind predicts that mental function should be very sensitive to brain damage, with small damage producing very large damage to mental performance. As discussed in my post here, we have much evidence of cases when very large damage to brains had little effect on mental performance. Karl Lashley did countless experiments testing changes in performance after animals had part of their brain removed or damaged. He found relatively little effect. For example:

1. 13 rats were trained to solve mazes, and we read here "only one animal did not show evidence of the maze habit after removal of the frontal portions of the brain."
2. Monkeys were trained to unlatch latch boxes. After having their prefrontal cortex removed, there was "perfect retention of the manipulative habits."
3. Lashley said, "A number of experiments with rats have shown that habits of visual discrimination survive the destruction of any part of the cerebral cortex except the primary visual projection area."
4. Lashley noted that you could remove half of an animal's cortex without reducing its performance on simple mazes.

A superb scientific paper describing cases of very high mental activity despite very great brain damage is entitled "Discrepancy Between Cerebral Structure and Cognitive Functioning," authored by Nahm, Rousseau and Greyson, two PhD's and an MD. On page 5 we learn of a case reported by Martel in 1823 of a boy who after age five lost all of his senses except hearing, and became bed-confined. Until death he "seemed mentally unimpaired." But after he died, an autopsy was done which found that apart from "residues of meninges" there was "no trace of a brain" found inside the skull. We read of cases reported by physician John Lorber, who studied patients who had lost more than half of their brain from hydrocephalus, a disease turning brain tissue into watery fluid. More than half of the patients studied had above-average intelligence, despite having brains that were mostly destroyed. We read this in the paper:

"[Lorber] described a woman with an extreme degree of hydrocephalus showing 'virtually no cerebral mantle' who had an IQ of 118, a girl aged 5 who had an IQ of 123 despite extreme hydrocephalus, a 7-year-old boy with gross hydrocephalus and an IQ of 128, another young adult with gross hydrocephalus and a verbal IQ of 144, and a nurse and an English teacher who both led normal lives despite gross hydrocephalus."

We are told of a 36-year-old man whose "intellect and language abilities were unimpaired" despite the fact that the left hemisphere of his brain was "almost completely lacking." We are told of a boy who was an average student at a regular school, even though he had a "nearly complete absence" of the right hemisphere of his brain. Referring to a study by Gilliam, the paper states that of 21 children who had parts of their brains removed to treat epilepsy, including 10 who had surgery to remove part of the frontal lobe, "none of the patients with extra-temporal resections had reductions in IQ post-operatively," and that two of the children with frontal lobe resections had "an increase in IQ greater than 10 points following surgery."

The paper here gives precise before and after IQ scores for more than 50 children who had half of their brains removed in a hemispherectomy operation in the United States. For one set of 31 patients, the IQ went down by an average of only 5 points. For another set of 15 patients, the IQ went down less than 1 point. For another set of 7 patients the IQ went up by 6 points.

The paper here (in Figure 4) describes IQ outcomes for 41 children who had half of their brains removed in hemispherectomy operations in Freiburg, Germany. For the vast majority of children, the IQ was about the same after the operation. The number of children who had increased IQs after the operation was greater than the number who had decreased IQs.

Such cases would never occur if prevailing neuroscientist dogmas were true.

Item #17: The Acquisition of Multiple Languages by a Very Young Child

Linguists such as Noam Chomsky have long recognized a very severe explanatory problem: the fact that very young children seem to acquire language skills much more quickly than anyone can explain. By listening to his parents speak (and perhaps also siblings), a child will pick up a new language with great speed. But it seems that the amount of listening the child does is not nearly sufficient to explain the speed with which the child seems to master the use of complex grammatical rules. Chomsky called this problem the "poverty of the stimulus" problem, meaning that the stimulus of hearing family members seems utterly inadequate to explain the mastery of complex language rules that occurs. The problem is doubled in the case of young children. What happens is that very young children with small brains achieve a marvel of learning more impressive than anything that people with much larger brains achieve in college, contrary to what we would expect from prevailing neuroscientist dogmas.

Item #18: Deathbed Visions

Some examples of deathbed visions can be found here and here and here. A survey of family members of deceased Japanese found that 21% reported deathbed visions. A study of 103 subjects in India reports this: "Thirty of these dying persons displayed behavior consistent with deathbed visions-interacting or speaking with deceased relatives, mostly their dead parents." A study of 102 families in the Republic of Moldava found that "37 cases demonstrated classic features of deathbed visions--reports of seeing dead relatives or friends communicating to the dying person." A 1949 book states this:

"It is a commonplace truth, observed by many physicians and clergymen, that a dying person, when conscious near the moment of death, acts or speaks as if he saw standing near loved ones who have already died. Dr. Russell Conwell told Bruce Barton in the interview quoted earlier in another connection, that he had witnessed this phenomenon 'literally hundreds of times.' "

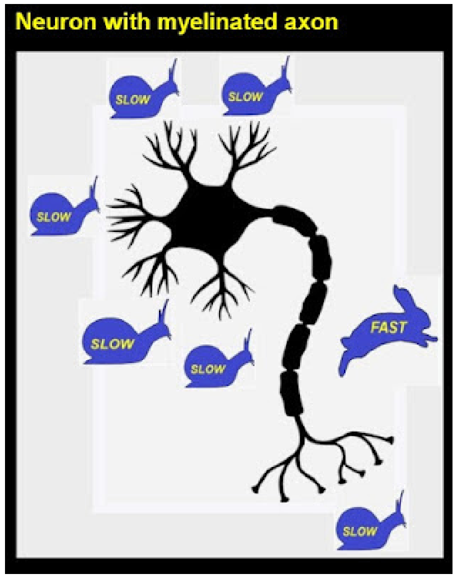
There is no credible explanation of this phenomenon within the framework of prevailing neuroscience dogmas. In the main scholarly work on the topic (*At the Hour of Death*, involving a well-funded multi-year study), the authors demonstrated that most such deathbed visions occur to people without organic brain disease, who were not on any drugs that might cause hallucinations.

Item #19: Very Fast and Accurate Complex Calculations by Anyone Not Using a Mechanical Device or a Writing Tool

Neelakantha Bhanu Prakash has been called the world's fastest calculator, and can do things such as multiply 869,463,853 times 73 correctly in only 26 seconds, giving an answer of 63,470,861,269. This is despite having a very serious head injury which required 86 stitches, and left him with a prominent scar on his forehead. According to the Guinness Book of World Records, "Scott Flansburg of Phoenix, Arizona, USA, correctly added a randomly selected two-digit number (38) to itself 36 times in 15 seconds without the use of a calculator on 27 April 2000 on the set of Guinness World Records in Wembley, UK." There are countless recorded cases of such blazing fast "all in the mind" calculation involving math or dates, and the cases often involve people with defective brains. For example:

- A Dr. J. Langdon Down described a 12-year-old boy who could multiply any three numbers by any other three numbers, as quickly as Down could write the six numbers on paper.
- A Dr. Alfred F. Tredgold mentioned a person who could give the square root of any four digit number in an average of four seconds, and who could give the cube root of any six-digit number in about six seconds. He said that when the same person "was asked about how many grains of corn there be in any one of 64 boxes, with 1 in the first, 2 in the second, 4 in the third, 8 in the fourth, and so on, he gave answers for the fourteenth (8,192), for the eighteenth (131,072), and the twenty-fourth (8,388,608) instantaneously, and he gave the answer for the forty-eighth box (140,737,488,355,328) in six seconds," and that he "also gave the total in all 64 boxes correctly (18,446,734,073,709,551,615) in forty-five seconds."
- A blind boy named Fleury was of such low intelligence he had to be institutionalized, but he could calculate 2 to the 30th power (1,073,741,824) in only 40 seconds, and could calculate the cube root of 465,484,375 (which is 775) in 13 seconds.
- A pair of twins named George and Charles (born three months prematurely) could do calendar calculations with blazing speed. We read this: "Give them a date and they can give you day of the week over a span of 80,000 years, 40,000 backward or 40,000 forward." Also, we read that if you "ask them to name in which years in the next 200 (or any 200) Easter will fall on March 23," then they "will name those years with lightning rapidity, faster than a computer and just as accurately." This seems all the more impressive when you consider that the rules for when Easter will occur in a particular year are quite complicated.

No such cases are explicable under prevailing neuroscience dogmas such as the dogma that the brain makes the mind. The reality is that the brain has shortfalls that should prevent any such thing from happening. The first shortfall involves speed. The widely quoted figure of about 100 meters per second for brain signals is very misleading. That is the fastest that a signal can travel in any part of the brain, when signals pass through myelinated axons. But most axons in the cortex are not myelinated, and most of the tissue in the brain consists of relatively slow dendrites. According to neuroscientist Nikolaos C Aggelopoulos, there is an estimate of 0.5 meters per second for the speed of nerve transmission across dendrites (see here for a similar estimate). That is a speed 200 times slower than the nerve transmission speed commonly quoted for myelinated axons. Then there is the enormous slowing factor caused by the need for brain signals to cross across synapses, serious "speed bumps" that should slow down brain signals very much.



There is no reason to think that the average speed of signals in the brain should be much faster than the speed at which electrical signals travel around the brain during seizures. The paper here lists a speed of only about 1 millimeter per second for seizures in the human brain, saying, "Seizures propagate slowly to connected areas with speeds on the order of 1 mm/s." There is no reason to think that some hypothetical brain signals involved in thinking would occur much faster than seizures. The problem is that such a speed is way, way too slow to account for the blazing fast mental speed of the world's fastest calculators.

Another shortfall of the brain is reliability. It has been repeatedly stated in neuroscience literature that brain signals travel across chemical synapses with a reliability of only .5 or smaller, and almost all synapses in the brain are chemical synapses. In an interview, an expert on neuron noise states the following:

"There is, for example, unreliable synaptic transmission. This is something that an engineer would not normally build into a system. When one neuron is active, and a signal runs down the axon, that signal is not guaranteed to actually reach the next neuron. It makes it across the synapse with a probability like one half, or even less. This introduces a lot of noise into the system."

That unreliability should utterly prevent accurate signal transmission, preventing any such thing as people accurately performing very complex calculations in their minds by using their brains. For people to accurately perform very quickly very complex calculations using a brain, the brain would need to have *both* reliable transmission across synapses and very fast average signal speed. Your very noisy brain has neither of these things. The very high levels of multiple types of noise in the brain should prevent both accurate recall of long bodies of text and also accurate "all in the mind" calculation of complex mathematical problems.

```
Original text:

We the People of the United States, in order to form
a more perfect union, establish justice, insure
domestic tranquility, provide for the common defense,
promote the general welfare, and secure the blessings
of liberty to ourselves and our posterity, do ordain
and establish this Constitution for the United States
of America.

Stored or retrieved text after a noisy transmission:

We the Peploe of the United Saetts, in oedrr to from
a mroe pfrecet unoin, ebsaitlsh jciutse, irnsue
deitmosc taluirtqniy, pvroide for the cmomon dsenfee,
potmore the genrael wlefrae, and surece the bsenigsls
of ltireby to olrseeuvs and our prettsoiy, do oiardn
and eltbsaish tihs Ctitisuootnn for the Uitend Steats
of Aiemcra.
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Item #20: Precognitive Dreams

In the posts below I have given many examples of dreams, visions or eerie voices that seemed to foretell a death:

When Dreams or Visions Foretell a Death

More Dreams or Visions That Seemed to Foretell a Death

Still More Dreams or Visions That Seemed to Foretell a Death

Still More Dreams, Visions or Voices That Seemed to Foretell a Death

Even More Dreams and Visions That Seemed to Foretell a Death

There is no credible explanation of such cases within the framework of prevailing neuroscientist dogmas.

Item #21: Experimentally Reproducible Precognition

Cornell University emeritus professor Daryl Bem wrote a paper published in a peer-reviewed scientific publication, the *Journal of Personality and Social Psychology,* a paper that seemed to show experimental evidence for precognition. The widely discussed paper was entitled, “Feeling the Future: Experimental Evidence for Anomalous Retroactive Influences on Cognition and Affect.” Skeptics were outraged by these results, claiming they would never be replicated. But they were replicated. The meta-analysis here ("Feeling the future: A meta-analysis of 90 experiments on the anomalous anticipation of random future events") discusses 90 experiments from 33 laboratories in 14 different countries. The analysis reported an overall effect of $p=1.2 \times 10^{-10}$. Roughly speaking, this means the results had a probability of about 1 in 10 billion. This is a very impressive result, showing statistical significance millions of times stronger than what is shown in typical papers reported by mainstream media. A typical paper that gets covered by the press will have a statistical significance of only about p=.01 or p=.05. There is no credible explanation of such evidence within the framework of prevailing neuroscience dogmas.

Item #22: Poltergeist Activity

There have been many well-documented cases of many objects inexplicably moving around in particular places. Twelve well-documented cases are discussed in my post here. Credible explanations of such cases involve ideas such as mind over matter, or activity by invisible spiritual forces. There are no credible explanations for such cases within the straightjacket of prevailing neurocience dogmas.

Item #23: Mind Over Matter

The mind-over-matter effect of table turning (also called table tipping) was reported with very great frequency by a host of distinguished observers in the nineteenth century. This phenomenon of table turning (and related anomalous phenomena) were scientifically investigated by a distinguished scientist, Harvard chemistry professor emeritus Robert Hare. Hare started out completely believing in Michael Faraday's idea that table turning was caused purely by muscular force. But his investigations led him to reject such an idea. In 1855 he published a long book reaching the conclusion that the phenomenon involved an inexplicable paranormal reality. For example, on page 46 he states, "I first saw a table continue in motion when every person had withdrawn to about the distance of a foot; so that no one touched it; and while thus agitated on our host saying, 'Move the table toward Dr. Hare,' it moved toward me and back again." This is only one of countless paranormal incidents described in the book, which Hare mainly regarded as proof of some mysterious paranormal reality. He devised numerous scientific instruments to test paranormal effects, and frequently found them to give dramatic inexplicable results.

This phenomenon of table turning was also scientifically investigated at length by Count Agenor de Gasparin, who published in 1857 a two-volume scientific book describing countless paranormal effects (such as table levitation and mysterious rappings) observed under controlled conditions. Gasparin's research is well-summarized in Chapter VI of the book *Mysterious Psychic Forces* by the astronomer Camille Flammarion. For example, Gasparin described this happening on September 3, 1853:

"Some one proposed the experiment which consists in causing a table to rotate and give raps while it has on it a man weighing say a hundred and ninety pounds. We accordingly placed such a man on the table, and the twelve experimenters, in chain, applied their fingers to it. The success was complete: the table turned, and rapped several strokes. Then it rose up entirely off the floor in such a way as to upset the person who was upon it."

Such a result is inexplicable through any theory of subconscious muscle movement. Gasparin reported the following occurring on October 7, 1853:

"Let us turn again to the finest of all demonstrations, that of levitation without contact. We began by performing it three times. Then, since it was thought by some that the inspection of the witnesses could be carried on in a surer way in the case of a small table than in that of a large one, and with five operators more certainly than with ten, we had a plain deal centre-table brought which the chain, reduced by half, sufficed to put in rotation. Then the hands were lifted, and, contact with the table being entirely broken, it rose seven times into the air at our command."

Since this was a report of levitation of a table without contact, it obviously cannot be explained through Faraday's “ideomotor effect” of subconscious muscle movement. Shockingly, the phenomenon of table turning had stood up well to rigorous scientific experiments, with the investigators finding it to be a mysterious paranormal reality rather than something they could debunk.

Something similar was reported in 1855 by Eliab Wilkinson Capron, who reported that a “table moved on the floor with nobody touching it – moved to the distance of a foot or more and back, in various directions.” In 1869 the London Dialectical Society (a rationalist organization) launched a major scientific investigation of phenomena such as table turning. It concluded that “movements of heavy bodies take place without mechanical contrivance of any kind or adequate exertion of muscular force by the persons present, and frequently without contact or connection with any person.”
Excerpts of the report of the committee can be read here, and the entire report can be read here. The twentieth century provided numerous additional examples of mind over matter, something that should never occur if the mind is merely the product of the brain.

Item #24: Medium Activity Seeming to Show Unaccountable Knowledge of the Deceased

The case of Leonora Piper is one of the most astonishing cases in the annals of psychic phenomena. Witnesses who met with her repeatedly claimed that she seemed to have knowledge that could not have been acquired through any well-understood means. For many years Piper would fall into a trance, and then begin speaking in a different-sounding voice, often a voice of someone identifying himself as someone other than Piper. Such a mysterious "control" would often seem to know things that Leonora Piper could not possibly have known. In later years under such trances Piper would produce writings called automatic writings. The case of Leonora Piper was extremely well documented in the Proceedings and Journal of the Society for Psychical Research. Using the link here takes you to my post linking to the original documents and the testimony of investigators. The original publication describing such observations can be read here.

On page 438 we read this: "Mr. Hodgson has been in the habit of bringing acquaintances of his own to Mrs. Piper, without giving their names; and many of these have heard from the trance-utterance facts about their dead relations, etc., which they feel sure that Mrs. Piper could not have known." On page 440 we read this introductory remark by Frederic Myers:

"On the whole, I believe that all observers, both in America and in England, who have seen enough of Mrs. Piper in both states to be able to form a judgment, will agree in affirming (1) that many of the facts given could not have been learnt even by a skilled detective ; (2) that to learn others of them, although possible, would have needed an expenditure of money as well as of time which it seems impossible to suppose that Mrs. Piper could have met ; and (3) that her conduct has

never given any ground whatever for supposing her capable of fraud or trickery. Few persons have been so long and so carefully observed ; and she has left on all observers the impression of thorough uprightness, candour, and honesty."

This all occurred in the late nineteenth century, which excludes all explanations of technological trickery. Within the framework of prevailing neuroscience dogmas, there is simply no explanation for a case such as this. So neuroscientists as a rule avoid mentioning it.

Item #25: Little or No Memory Loss After Hemispherectomy Operations

Below are the results reported in the American Journal of Psychology, Vol. 46, No. 3 (Jul., 1934), pages 500-503, regarding work of W. E. Dandy, in which he removed half of the brains of patients. You can read the results in the preview here (without doing any registration). We read the following (I have put a few of the sentences in boldface):

"*Dandy has completely removed the right cerebral hemisphere from eight patients. He has performed total extirpations of one or more lobes much oftener... There are tabulated below certain generalizations on the effects of removing the right hemisphere.... The operation was the complete extirpation of the right frontal, temporal, parietal, and occipital lobes peripheral to the corpus striatum. The weight of the tissue removed varies, with the pathological conditions involved, from 250 to 584 grm [grams].Coherent conversation began within twenty-four hours after operation, and in one case on the afternoon of the same day.* ***Later examinations showed no observable mental changes. The patients were perfectly oriented in respect of time, place, and person; their memory was unimpaired for immediate and remote events; conversation was always coherent; ability to read, write, compute, and learn new material was unaltered.*** *Current events were followed with normal interest. There were no personality changes apparent; the patients were emotionally stable, without fears, delusions, hallucinations, expansive ideas or obsessions, and with a good sense of humor; they joked frequently. They showed a natural interest in their condition and future. They cooperated intelligently at all times throughout post-operative care and subsequent testing of function."*

It would be rather hard to imagine a more decisive refutation of the claim that the human brain is the source of the human mind, and the claim that the human brain is the storage place of human memories. Here are eight people who had half of their brains removed. Yet the people showed "no observable mental changes," and "their memory was unimpaired for immediate and remote events." The people could read, write, compute and learn just as if nothing had happened, and "there were no personality changes."

On page 59 of the book *The Biological Mind*, the author states the following about hemispherectomy operations involving removal of half of the brain, to stop very severe and frequent seizures:

"A group of surgeons at Johns Hopkins Medical School performed fifty-eight hemispherectomy operations on children over a thirty-year period. 'We were awed,' they wrote later of their experiences, 'by the apparent retention of memory after removal of half of the brain, either half, and by the retention of the child's personality and sense of humor.'

Item #26: Long-Term "Body Borrowing"

Two very well-documented cases of this phenomenon are discussed in my long post "When Minds Seem to Borrow Bodies." In both cases a living person claimed to be a person who had previously died, showing memories matching those of the deceased person. Such cases have no explanation within the framework of prevailing neuroscience dogmas.

Item #27: Life-long Continuation of a Single Self in Someone With a Normal Brain

There is nothing rare in the life-long continuation of a single self in someone with a normal brain. Such a thing happens with almost everyone, except perhaps split personalities. But the simple fact of unvarying self-hood is inexplicable under prevailing neuroscience dogmas. The diverse regions of the brain produce billions of largely random electrical signals, which we should never expect to give rise to a single unified self. The brain consists of two identical hemispheres, and if such hemispheres were to give rise to any selves, we would expect that the result would be two selves, rather than one.

Item #28: Telepathy Verified Under Laboratory Conditions

Some very convincing examples of ESP under experimental conditions are discussed here, here and here. The table below (from the link here) summarizes the results of Professor Joseph Rhine's laboratory experiments with Hubert Pearce at Duke University. These are tests in which the expected success rate is 5 out of 25, or 1 in 5. There is no way to work in some hypothesis of cheating with the results reported here. The table shows that Pearce got the same super-dramatic results even in a series of 650 trials when he was looking away from the cards, and also in a series of 300 trials in which there was a screen separating the cards and Pearce.

Ser. No.	Conditions	No. of Trials	No. of Hits	Deviation and p.e.		Value of X	Avge. per 25
1.	General B.T. as described above *Special Conditions*	5,000	1,834	+834	±19.1	43.7	9.2
2.	S. looks away from cards	650	279	149	6.9	21.6	10.7
3.	Same as 2, plus calling before removing	475	236	141	5.9	23.9	12.4
4.	Same as 3; no contact with cards	275	74	19	4.5	4.2	6.7
5.	Same as 3, plus *New cards*; data on first 3 times used	1,675	626	291	11.0	26.5	9.3
6.	(a) Screen, concealing cards (B.T)	300	99	39	4.7	8.3	8.3
	(b) Same, plus P.T. (*i.e.*, gen. E.S.P.; Agent screened)	300	116	56	4.7	11.9	9.7
7.	D.T., pack left unbroken till end of run	1,625	482	157	10.9	14.4	7.4
Total, P.C. (except 6b)		10.300	3,746	+1.686	±27.4	61.5	9.1

Even more impressive was the result of a remote test, in which a Professor Riess performed thirty-seven experimental sessions in which a 26-year old woman in a different building was asked to guess which of 5 ESP cards had been randomly chosen by Professor Riess. The woman guessed an average of 18.24 cards correctly per 25 cards, achieving a phenomenal 73% accuracy rate (instead of the expected accuracy rate of 20%). This was the result in "Series

A" of two series of tests with the young woman. The chance of getting such a result accidentally is far less than 1 in 1,000,000,000,000,000 (this link estimates the probability of getting these results by chance as 1 in 10 to the 700th power, which is smaller than the chance of you correctly guessing all of the social security numbers of a set of 70 strangers). Page 36 of Louisa Rhine's book *ESP in Life and Lab* tells us the story of the Riess remote ESP test described above. The Riess experiment is also discussed on page 167-168 of Rhine's book *Extra-sensory Perception After Sixty Years* (see here or here). Another discussion of the experiment is here.

A paper on the Cornell Physics Paper server gives this summary of the telepathy evidence from the ganzfeld experiments run in recent decades, in which the success rate expected by chance is 25%:

"From 1974 to 2018, the combined ganzfeld database contained 117 studies. Of those, studies using targets sets with 4 possible targets included 3,885 test sessions, resulting in 1,188 hits, corresponding to a 30.6% hit rate. With chance at 25%, this excess hit rate is 8.1 sigma above chance expectation ($p = 5.6 \times 10^{-16}$). Analysis of these studies showed that similar effect sizes were reported by independent labs, that the results were not affected by variations in experimental quality, and that selective reporting biases could not explain away the results. The Bayes Factors (BF) associated with the last 108 more recently published ganzfeld telepathy studies was 18.8 million in favor of H1 (i.e., evidence favoring telepathy). Given that BF > 100 is considered 'decisive' evidence, this outcome far exceeds the 'exceptional evidence' said to be required of exceptional claims.[48,49] By comparison, in particle physics experiments effects resulting in 5 or more sigma are considered experimental 'discoveries.' "

The probability of 1 in 5.6×10^{-16} cited is a likelihood of less than 1 in a quadrillion. Within the framework of prevailing neuroscience dogmas, all such results are inexplicable. Since the results are largely remote results produced by people separated by distance, they cannot be explained by any speculative theory that the brain can act as a radio transmitter and radio receiver (a theory not supported by any neuroscience studies).

Item #29: Continuation of a Single Self After Split-Brain Surgery

To stop very bad epileptic seizures, doctors sometimes sever the corpus callosum that connects the two hemispheres of the brain. If prevailing neuroscience dogmas were true, such an operation should either produce a radically diminished mind, or two minds in the same body. No such thing happens, although sometimes we hear deceptive claims to the contrary.

In the video here we see a split-brain patient who seems like a pretty normal person, not at all someone with "two minds." And at the beginning of the video here the same patient says that after such a split-brain operation "you don't notice it" and that you don't feel any different than you did before – hardly what someone would say if the operation had produced "two minds" in someone. And the video here about a person with a split brain from birth shows us what is clearly someone with one mind, not two.

A scientific study published in 2017 set the record straight on split-brain patients. The research was done at the University of Amsterdam by Yair Pinto. A press release entitled "Split Brain Does Not Lead to Split Consciousness" stated, "The researchers behind the study, led by UvA psychologist Yair Pinto, have found strong evidence showing that despite being characterised by little to no communication between the right and left brain hemispheres, split brain does not cause two independent conscious perceivers in one brain."

The press release states the following: "According to Pinto, the results present clear evidence for unity of consciousness in split-brain patients."
The paper states, "These findings suggest that severing the cortical connections between hemispheres splits visual perception, but does not create two independent conscious perceivers within one brain." The article here in Psychology Today describes the bizarre experiment that was used to make the groundless claim that split-brain patients have two minds. It was some experiment based only on visual perception, using some strange experimental setup unlike anyone normally encounters. The article shreds to pieces claims that results from such an experiment show that split-brain patients have two minds:

"Not so fast. There are several reasons to question the conclusions Sperry, Gazzaniga, and others sought to draw. First, both split-brain patients and people closest to them report that no major changes in the person have occurred after the surgery. When you communicate with the patient, you never get the sense that the there are now different people living in the patient's head.

This would be very puzzling if the mind was really split. Currently, you are the only conscious person in your neocortex. You consciously perceive your entire visual field, and you control your whole body. However, if your mind splits, this would dramatically change. You would become two people: 'lefty' and 'righty.' 'Lefty' would only see what is in the right visual field and control the right side of the body while 'righty' would see what's in the left visual field and control the left side of the body. Both 'lefty' and 'righty' would be half-blind and half-paralyzed. It would seem to each of them that another person is in charge of half of the body.

Yet, patients never indicate that it feels as though someone else is controlling half of the body. The patients' loved ones don't report noticing a dramatic change in the person after the surgery either. Could we all — patients themselves, their family members, and neutral observers — miss the signs that a single person has been replaced by two people? If you suddenly lost control of half of your body, could you fail to notice? Could you fail to notice if the two halves of your spouse's or child's body are controlled by two different minds?"

Item #30: Dream Series Repeating Themes of Life After Death

In general neuroscientists have no credible explanations for why dreams should occur. Neuroscientist speculations about some memory function of dreaming are not well-supported by evidence, and are contradicted by the fact that most people's dreams seem to involve random content unrelated to anything recently learned.

In a Dream Catcher study described here and the 2020 scientific paper here, EEG recordings were made of subjects while they were sleeping. The subjects were awakened at random times, and asked to tell whether or not they were dreaming. Then some scientists ("blind" to which EEG readings were from the dreamers) were asked to guess whether particular subjects were dreaming. The result was a null result. There was no evidence that by studying EEG recordings you can tell whether a person is dreaming.

Scientists apparently delayed the release of these results for years. A 2015 paper describes results just like those of the Dream Catcher study, but results that had apparently not yet been published:

"When data from serial awakenings of 9 subjects had been collected, these data were divided. Introspective reports and electroencephalographic recordings were analysed by different judges who were ignorant of which EEG sequences had led to dream reports and which ones had not. An external EEG research group used a number of statistical methods to identify the signature of the recordings that were followed by dream reports. But the accuracy of their predictions turned out to be no better than chance. A doctoral researcher presenting these findings at a conference explained that there were 4 different explanations for this failure: 'Subjective experience is a) not in the brain, b) is in the brain, but not in the EEG, c) is in the EEG, but not in our data, or d) is in the data, but needs more complex and novel methods of analysis.'"

In the past two years I have had an experience of dreams that would never occur if prevailing neuroscience dogmas were true. In the very long post here (entitled "I Keep Dreaming of Danger, Death, the Deceased and Life After Death") I describe more than 300 dreams I had seeming to symbolically suggest the idea of life after death. Such a series cannot be credibly explained by any materialist ideas, for reasons I discuss in my post here. Besides such dreams, which are dreams of a philosophical type, I sometimes have other types of philosophical dreams, such as a dream pondering the fine-tuning of the universe's fundamental constants, and a dream pondering biological complexity, one in which I correctly remembered the human body has about 200 types of cells and about 20,000 different types of protein molecules. Having no credible ideas of how a waking person could have abstract ideas, neuroscientists cannot even credibly explain philosophical thinking from an awake person, and under their dogmas philosophical thinking while dreaming is something never to be expected.

How did our professors and science writers go so wrong, by teaching for so long the theory that the mind is a mere product of the brain and that memory is a brain effect, a theory of the mind so dramatically incompatible with so many observations? I can explain it sociologically with a physical metaphor: such persons were kind of snowflakes gathered up by a giant rolling snowball. The way in which ivory tower theories pick up supporters over the years has been described as a snowball effect, one in which the bigger the downward rolling snowball, the more snowflakes are picked up by the snowball. Gaining countless followers mainly because of its mere popularity, the giant rolling snowball of "brains make minds" kind of merged with another giant rolling snowball gaining countless followers mainly because of its mere popularity: the giant rolling snowball of Darwinism. The combined downward-rolling snowball of Darwinist materialism continues to gain countless followers almost entirely because of its size, just as the bigger the snowball rolling down a mountain, the more snowflakes it sucks up.

But it's a funny thing about giant snowballs rolling down mountains: eventually they stop rolling, and later even in cold climates they tend to melt in the summer. If enough people give enough study to topics and observations that have been senselessly ignored or swept under the rug (the type of things discussed on this blog), then the sociological snowball that is Darwinist materialism will eventually be mostly melted by a glorious summer enabled by the sun of truth.

at December 10, 2022 No comments:

Labels: brain shortfalls, brain signal speed, ESP, hemispherectomy, high mental function despite large brain damage, memory recall, memory storage, near death experiences, out-of-body experiences

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Head Truth

The huge case for thinking minds do not come from brains

Sunday, December 4, 2022

Scientists and Clergy Have Much in Common

In the political history of the United States, there have been very many "out with the old, and in with the new" elections that have tended to follow a rather sad pattern:

(1) Some political party that is not in power will seek to win an election, claiming that things will be new and wonderful if only it takes power. The party in power will be portrayed as guilty of various sins of government such as negligence, incompetence or corruption.

(2) The political party seeking to gain the voter's trust may win in the election. Its leaders will promise that now things are going to be so much better.

(3) After a few years (or maybe only months) it will usually become rather apparent that the new leaders are largely guilty of the same sins of the old leaders.

Such a scenario happens over and over again, because of faults and foibles of human nature. Over the centuries humans tend to make the same mistakes over and over. Many a group promising to be a "change for the better" may end up committing many of the same old errors and sins as the group they replaced or superseded.

A rather similar scenario has played out very often in world history when some regime was overthrown by another regime. The new regime gains power partly by promising to correct the incompetence, injustice or tyranny of the old regime. But often the new regime may be guilty of incompetence, injustice or tyranny just as bad as the regime it replaced. Examples include the French Revolution (when an unjust monarchy was replaced by what turned into the brief tyranny of the Reign of Terror), and the Russian Revolution (when the often brutal and oppressive monarchy of the czars was replaced by an even more brutal and oppressive tyranny of the communists).

Americans have a cynical expression to describe this type of thing: the expression, "Meet the new boss, same as the old boss."

In the world of intellectual affairs, there very gradually occurred a kind of "regime change," under which the old power of the clergy was very gradually replaced by the power of scientists. Scientists describing such a change describe it as a great virtuous progression, in which the Bad Old Way was replaced by the Good New Way. But such a story is a gross oversimplification. It seems that in many ways we simply ended up with a new kind of white-coat priesthood with many of the problems of the old black-cloak priesthood.

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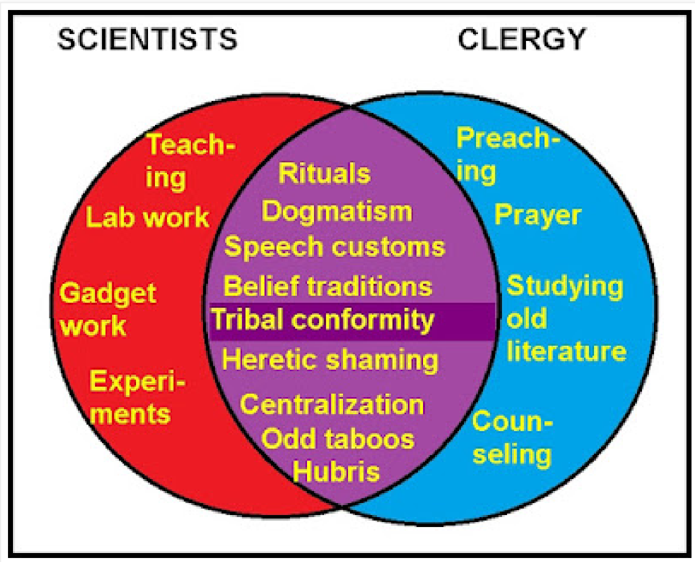
The visual below illustrates this point. We see a Venn diagram that shows how scientists and their communities bear a great resemblance to clergy and their communities, with a large degree of overlap. The purple shows the tendencies we see in both scientists and their communities and clergy and their communities.



Let me explain each of the items I have mentioned in the purple section of the diagram above.

Rituals

The Cambridge Dictionary defines "ritual" as "a way of doing something in which the same actions are done in the same way every time." The clergy of the Catholic Church have many rituals such as the Mass and baptism. Protestant clergy also have rituals, doing the same things in exactly the same way during baptism, weddings, funerals and so forth. Like the clergy, scientists follow many rituals. The process by which someone becomes a scientist (by doing research and writing a PhD thesis, and having it approved by professors) is a ritual. The writing of a scientific paper and its approval and publication is a ritual that follows a set of old conventions. Such conventions include having a section of the paper entitled an "Abstract," and another section entitled "Materials and Methods" (even when no materials were used); requiring the paper to be peer-reviewed by scientists in the same field (very often a pure formality failing to exclude poorly designed research); and the submission of the paper to some expensive journal that often makes it difficult for the general public to read the full paper. Very much of experimental work these days is a ritual. There are quite a few other scientist rituals such as going to research conferences and giving presentations at such conferences, rituals involving research grant applications, many types of academia rituals such as teaching the same lessons over and over, and the annual ritual of awarding Nobel Prizes.

Dogmatism

A dogma is an unproven belief that is frequently stated as if it was a fact or certainty. Each type of clergy has its own dogmas. The clergy of the Catholic Church has dogmas such as purgatory, the Immaculate Conception, the Trinity, the infallibility of the pope, and so forth. The clergy of Protestantism rejects some of the chief dogmas of the Catholic Church, but tends to teach its own dogmas such as the power of intercessory prayer and the idea that the Bible is the Word of God. Dogmatism is also a very common trait of scientists. Scientists adhere to unproven dogmas such as the claim that life first arose accidentally, the claim that all species have a common ancestor, the claim that human memories are stored in brains, and the claim that the human mind is a product of the brain (or the same thing as brain processes). Because scientists enforce a constant repetition of such dogmas, you may not realize how questionable and unproven some of these claims are. For example, scientists constantly repeat the dogma that memories are stored in brains; but no one has ever discovered or read a memory by studying human brain tissue, and there is a long list of reasons (you can read here) for rejecting all claims that memories are stored in brains.

Speech Customs

The clergy have speech customs, things that they tend to say over and over again, using the same type of words and phrases each time. Priests of the Catholic Church have various Latin phrases that they used to repeat countless times when performing a mass, and nowadays the same phrases are massively repeated in languages such as English. Clergy of Protestant churches also have phrases that they repeat over and over again, such as "Praise the Lord" and various quotes from the Bible. Scientists also have many different speech customs. Using the phrase "natural selection" is an example of a speech custom of modern scientists. The phrase is not at all one that naturally arises from any consideration of nature, and when scientists use the phrase they are not actually referring to any act of selection. Another example of a speech custom of scientists is the strange custom of using phrases such as "your brain remembered" or "your brain decided" or "your brain selected" rather than simply using simpler and less dogmatic phrases such as "you remembered" or "you decided" or "you selected." Such customs serve as a way of reinforcing dogmas that the modern scientist wants everyone to believe in. There are innumerable other speech customs of scientists, such as saying "there must be a logical explanation" upon hearing any report of paranormal phenomena they don't understand and cannot explain. Implicit within such a phrase is a kind of accusation that any report that does not fall within their materialist framework must be illogical. An extremely common speech custom of evolutionary biologists is to describe features of organisms using phrases with a form "*x* evolved *y*." Such speech is an example of unnecessary ideological baggage. For example, you describe the ears of elephants adequately by saying something like "elephants have large sheet-like ears." It is unnecessary to make a debatable claim such as "elephants evolved large-sheet like ears."

Belief Traditions

It is rather obvious that belief traditions are extremely common among the clergy. The clergy of the Catholic Church dates back almost two thousand years, and over such a time very many belief traditions have developed. The Protestant clergy has only existed for a few centuries, but in that time many belief traditions have developed. In general the clergy tends to follow a rule of "believe as your father and his father believed." While scientists do not tend to explicitly state such a rule, there are very many belief traditions that scientists follow, largely as an act of social conformity and adherence to tribal tradition. I will give an example of one of the innumerable belief traditions of scientists.

Let us imagine that there is an effect (call it Effect X) that occurs indoors inside a room with closed doors. A belief tradition of scientists is that any such effect must have some physical cause, and cannot be caused by some invisible agent. How did scientists get such a belief? It arose merely as a tradition. Scientists believe such a thing pretty much because they think that such an assumption has always been held (or has very long been held) by scientists such as themselves. They certainly did not reach such a belief after exhaustively studying nature, because the history of human observations contains countless thousands of respectable witnesses who reported indoor physical effects that seemed to arise from invisible agents, or at least were inexplicable from any observable physical cause or human cause.

There are very many other belief traditions of scientists which have slowly arisen, often without any adequate empirical warrant. In some major cases scientists have no insight that some belief dogma they hold is actually a belief dogma, and something never well-established by observations, because within their community there may be such constant repetition of a claim that the claim starts to sound like fact, even though the claim may be not established by observations and actually contradicted by observations. In Episode 3 of the Netflix TV show "Ancient Apocalypse," a scholar makes a relevant observation, stating this: "When a particular mindset has become the preoccupation of a group of scholars in a particular field, they are so reluctant to let go of it, they become existentially attached to it, and an attack on the paradigm becomes an attack on them, and they vigorously defend it."

Tribal Conformity

It is not true that there is a single clergy tribe that acts and speaks in the same way. Instead, there are quite a few different clergy tribes, each of which acts in a characteristic way. If you are a member of one of these tribes, you will tend to act and speak in the way that other members of your tribe are acting and speaking. For example, a Catholic priest will tend to act and speak in a way that other Catholic priests act; and a Baptist minister will tend to act and speak the way that other Baptist ministers act and speak. In the world of scientific academia, there are many different tribes, each of which tends to act and speak in some characteristic way.

One example of a scientific tribe is the small tribe of cosmologists, one that very much has its own speech customs and behavior customs. For example, within the tribe of cosmologists it has been a custom since about 1980 to make the empirically groundless claim that the universe underwent an instant of exponential expansion during a fraction of its first second. When such cosmologists follow this tribal speech custom, they use the term "cosmic inflation." Similar customs within the small tribe of cosmologists is to claim the existence of never-observed dark matter and never-observed dark energy. The tribe of neuroscientists is another example where we see very strong tribal conformity. Besides many speech customs, such neuroscientists have many behavior customs, some highly dysfunctional. Within the tribe of neuroscientists, it is a custom to run experiments using way-too-small study group sizes, often fewer than 15. In their papers such neuroscientists often state that the study group sizes were selected based on the study group sizes in similar papers in the literature. This is basically a confession that the scientists were acting according to prevailing customs within their tribe.

Below a professor discusses the tendency of professors to form tribes resembling religious sects:

- Why Brains Are Not Suitable for Storing Long Sequences Like Humans Remember
- Why Brain Scans Don't Show Brains Make Minds
- Why Strokes, Alzheimer's Disease and Drunkenness Don't Prove the "Brains Make Minds" Dogma
- Synaptic Density Studies Contradict the Most Popular Memory Theory
- The Rare "Total Recall" Effect That Conflicts with Brain Dogmas
- Physical Connections Do Nothing to Explain Cognition
- The Sociological Reasons Why Bad Explanations Persist in Academia
- Split-Brain Cases Conflict with "Brains Make Minds" Dogma
- Why So Much of Neuroscience News Is Unreliable
- An Analogy Clarifying Why the "Brain Stores All Your Memories" Dogma Is Untenable
- Why Darwinism Fails to Explain the Human Mind
- What Is It That a Brain Does?
- Cloud Computing and a Non-Local Model of Consciousness
- Why We Do Not Understand the Origin of Complex Biological Innovations
- Our Minds May Arrive Top-Down Not Bottom-Up
- Fancy New Technology Fails to Prove Memory Dogmas
- The Argument for Determinism Collapses Once We Discard the "Minds Come from Brains" Dogma
- Animal Experiments Conflicting with the Dogma That the Brain Stores All Memories
- Memory Recall Reality Versus the "We Can't Remember Well" Bunk of Professors
- Neuroscientists Keep Using Misleading Coloring in Brain Visuals
- Most Scientists Don't Follow Formal Evidence Standards, Unlike Judges
- Experimental Evidence for ESP Is Well-Replicated
- Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades
- NIH Bets $1,434,188 That Synapses Don't Store Memories
- A New Case of Very Large Brain Damage and Normal Mental Function
- When Clue-Blind Professors Ignore All the Signs

"We organize ourselves into academic 'sects' that engage in self affirming research and then wage theological debates between academic religions...We narrow the permitted subject matter of our studies to those topics, periods, and observations that tend to confirm the particular strengths of our tradition....By narrowing its empirical focus, however, each tradition affirms itself by studying that which it does best and ignoring subjects that do not conform to expectations. This produces self-affirming sects that come to believe in the power of their tradition based on a selective reading of the possible empirical evidence. It is here that research traditions move from the realm of objective social science to theology. Having adopted a tradition, we then look only for evidence that affirms our prior belief in the rightness of that tradition. Practice becomes not an attempt to falsify theories through ever more demanding tests, but to support theories that were adopted prior to their confrontation with evidence."

We very much see such things occurring in neuroscience, where scientists senselessly focus on a few selected types of evidence (things like brain scanning and animal experiments) that they think may confirm their cherished dogmas, while paying no serious attention to a huge body of evidence (including study of heavy brain signal noise and signal unreliability, rapid brain molecular turnover and structural instability, and two hundred years of written evidence for paranormal phenomena) that conflict with their cherished dogmas.

Heretic Shaming and Heresy Suppression

Heretic shaming is when a member of some belief community attempts to shame someone holding a belief that deviates from the teachings of the belief community. Clergy have long engaged in heretic shaming. The strongest type of heretic shaming seems to occur when someone has been accepted into some belief community, but then deviates from the teachings of that belief community. In the history of the Catholic Church there was not merely heretic shaming but also violent persecution of Christians holding doctrines differing from the doctrines approved by the Catholic Church. In the community of scientists, there occurs very severe heretic shaming for anyone who deviates from the belief norms of the community. A scholar who seems to believe in some doctrine forbidden by a community of scientists may be denounced as a "kook," a "weirdo," a "crank" or a "crackpot." In the post here I document a very clear example of this type of heretic shaming: a case of the major scientific publication Science pretty much calling for the firing of a physical science PhD, merely because he seemed rather sympathetic to some claims of paranormal activity, without even clearly endorsing any such claim. That example is one of countless examples I could give of scientists engaging in heretic shaming. In the sociological study of what is called groupthink, the term *mindguard* is used for those who attempt to enforce group conformity by shaming or denouncing those within the group who deviate from the group's orthodoxy. Many a scientist has acted as such a mindguard. Some of the attempts in the world of scientific academia to suppress inconvenient observations are documented in Etzel Cardena's paper "The Unbearable Fear of Psi: On Scientific Suppression in the 21st Century."At the link here, we read of the heresy shaming of a thinker who did not even challenge any of the core tenets of astronomers, but merely maintained that Venus had arisen after being ejected from Jupiter:

"When Worlds in Collision *came out, its would-be publisher, Macmillan, was threatened with a boycott of all its books. The editor who bought the*

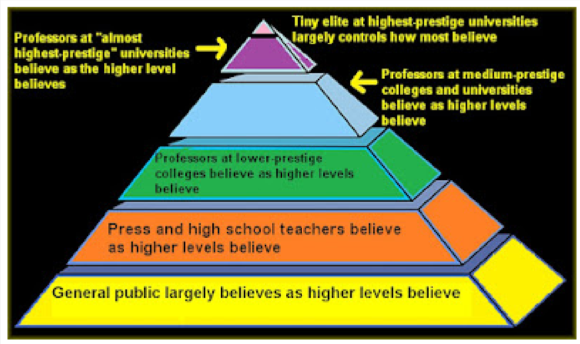
manuscript was fired...A concerted effort was made to suppress Velikovsky's ideas. His data was distorted, the presentation of his views blocked, his books boycotted or scurrilously reviewed, his supporters fired, his integrity impugned -- all because his ideas challenged an existing dogma."

A recent paper ("Censorship and Suppression of Covid-19 Heterodoxy: Tactics and Counter-Tactics") in an academic journal described some more recent examples of heresy shaming and heretic persecution in which people with reasonable unpopular opinions on COVID-19 (such as the now widely accepted "lab leak hypothesis") were defamed: "Respondents reported that exclusion was only the first step: shortly after that they started being subjected to defamation by the media, and disparaged as 'anti-vaxxers,' 'Covid deniers,' 'dis/misinformation spreaders' and/or 'conspiracy theorists.'" We read of a wide variety of tactics used to suppress dissenting opinions on COVID-19, including threats, non-renewal of academic contracts, paper retraction, and a kind of "blacklisting." The article paints the media, government, doctors, scientific publishers and academia officials as the main bad guys in this heretic persecution affair, failing to mention that scientists themselves played a very large role in such heresy shaming and heresy suppression, as I discuss and document here and here. Recently I read a post by an archaeologist furiously libeling an archaeological theorist who seemed guilty of nothing other than advancing a mildly unconventional theory of archaeology. Quite a few similar posts appeared at the same time.

An extremely common form of attack (rather like an attempted burning of a heretic) these days in academia is what I might call "contagion allegations," in which some professor attempts to deligitimize some contrarian thinker mainly by attempting to claim some association or similarity between such a thinker and some other group regarded as kind of "radioactive" within the professor's echo chamber. The attempts are often ridiculously strained. It's kind of like what went on during the McCarthy Era, when people tried to deligitimize someone by showing any trace of association with forbidden ideas. During the early 1950's in the US there was no need to prove someone was a communist; it seemed sufficient within certain circles to merely show that maybe the person was a friend of a friend of a communist, or that maybe the person once had dinner with a communist. Much the same goes on nowadays in academia. Large fractions of the populace have been branded as the politically incorrect "radioactive," and our academia would-be-heretic-burners seem to think all that you need to take down some person (to kneecap him) is to claim some association or similarity (no matter how tenuous) between that targeted person and anyone in the many despised groups branded as "radioactive" because of their "thought crimes."

Centralization

In a belief community there is centralization whenever there is some hierarchical structure under which a relatively small number of people have enormous control over the beliefs or conduct of other people. While there isn't much centralization in Protestantism, the Catholic Church is very much an institution showing centralization, with there existing a hierarchical structure with the Pope at its top. Among scientists there is also a large amount of centralization. A relatively small number of scientists (such as Nobel Prize winners and professors at the ten most famous universities) have influence so enormous that it is often like all the other scientists in their field are controlled from the top. The diagram below illustrates such centralization.



Within academia we find a hierarchical authority structure rather resembling the structure of the Catholic Church, with chancellors and deans acting like cardinals, full tenured professors acting like bishops, assistant professors or adjunct professors acting like priests, mere "post-docs" or lecturers or readers acting like deacons or nuns, and ordinary students acting like parishioners in their pews. In graduation ceremonies the professors even wear robes resembling priestly robes.

Odd Taboos

Strange taboos exist among clergy communities. Perhaps the most prominent example in the Catholic Church is a taboo against marriage or sexual relations for priests or nuns, who must take oaths of celibacy. For most of the time that the Catholic Church and Protestant churches have existed, there has been in both groups a taboo against the clergy engaging in homosexual behavior or premarital sex. There are countless other taboos that are followed by clergy or encouraged by clergy. Scientists also have many odd taboos. A very strange taboo among modern scientists is the reporting of paranormal phenomena, and the serious honest study of previous reports of paranormal phenomena. This taboo is extremely strange, given that science is supposed to be centered around observations. Serious respectable people have been writing written reports of paranormal phenomena for nearly two hundred years, going all the way back to the 1831 report of the French Royal Academy of Medicine, which found resoundingly in favor of clairvoyance. So how could making such observations (or objectively reporting on such observations by others) be a taboo among scientists? The explanation is to be found in the belief traditions of scientists, including beliefs that there are no unobservable entities influencing our world, and that human behavior is entirely explained by the brain. So it has become a taboo among scientists to discuss or seriously study observations that conflict with the belief traditions of scientists.

An old news story gives us an example of neuroscientists trying to exclude their fellow tribe members from hearing about things that might upset their belief system:

"A growing number of neuroscientists are calling for the cancellation of a special lecture to be given by the Dalai Lama in November. The Buddhist leader is due to speak at the annual meeting of the Society for Neuroscience (SfN) in Washington DC, but a petition against the talk has already gathered some 50 signatures....Over the past decade he has increasingly encouraged researchers, sometimes at gatherings at his home, to study whether Tibetan Buddhist meditation can reshape the brain and increase mental well-being (see Nature 432, 670; 2004)."

Were True

- "Brains Make Minds" Models All Flunk a Large Brain Scan Study
- The Philosophy of Teleospiritism
- The Biggest Blunders of Theories Such as Integrated Information Theory
- Study Finds No Robust Link Between Brain Structure and Personality
- The Two Huge Mistakes Involved in Typical Talk of a "Hard Problem of Consciousness"
- Neuroscientists Keep Wrongly Assuming the Source of Something Must Be Near Its Observed Manifestations
- The Vague Unfounded Boasts of Biology Sound Like the Vague Unfounded Boasts of Astrophysics
- 8 Reasons for Doubting Claims of the Heritability of Intelligence
- Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"
- Exhibit A Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- Exhibit B Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- More Indications Scientists Don't Understand How a Brain Could Think or Remember
- Studies New and Old Fail to Show a Big Link Between Brain States and Minds

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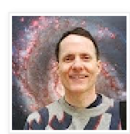

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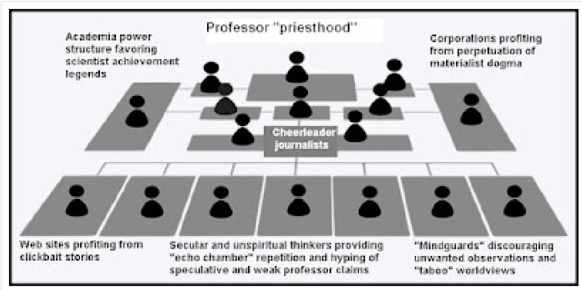
March 2023 (2)

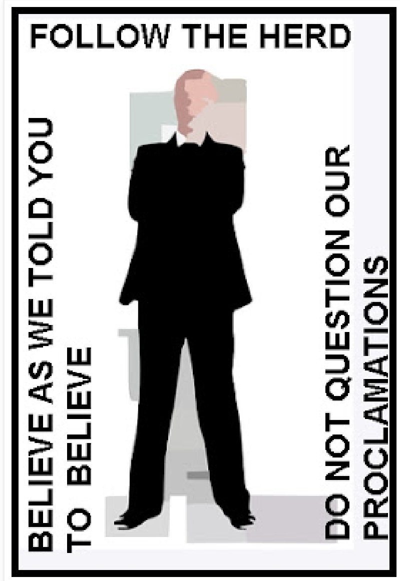
The diagram below (which fails to mention the key factor of govenment funding) is only a very rough sketch of the extremely complicated power structure maintaining the excessive influence of professors. A key element in the power structure is various parties acting to enforce taboos by discouraging contrarian worldviews and suppressing or discouraging the fair and thorough scholarly examination and discussion of evidence contrary to professor dogmas.



Hubris

Hubris is a two-syllable word meaning the same as the five syllable word "overconfidence." Intellectual hubris has long been a characteristic of the clergy, whose members have sometimes sounded as if they had God's phone number, or an exact understanding of deep mysteries that philosophers continue to debate. Hubris has also long been a characteristic of scientists. When modern science got started around the time of Galileo, scientists seemed very humble before the great mysteries of nature. But in the late nineteenth century and early twentieth century, scientists began to spread many a triumphal legend. Showing very great overconfidence, scientists claimed that professors now understood great mysteries such as the origin of life or the origin of most species or the origin of humanity. As the amount of discovered complexity and organization in human bodies and all organisms has grown exponentially during the past 100 years, such triumphal legends sound more and more like groundless boasts, mere examples of hubris.

A huge example of hubris among modern scientists is their groundless claims to understand the origin of human minds, something they refuse to properly study because of their strong taboos against studying anomalous mental phenomena that conflict with their explanatory boasts. Such unfounded claims are propped up by the carrying out of dysfunctional rituals, such as the running of poorly designed experiments following shoddy research practices such as having insufficient study group sizes. A proper study of the low-level details of the brain (and the shortfalls of modern neuroscience research), will lead you to the conclusion that the explanatory hubris of scientists on this topic is senseless, and the reigning explanatory tales on this topic are not merely unfounded but in conflict with the most relevant observations. You can begin such a study by reading the posts of this blog.



Scientists and clergymen may urge similar things

Mystifying Obscurantism

Not mentioned in the diagram above (for lack of space) is another tendency common in both scientists and clergy: a tendency towards mystifying obscurantism. In the Catholic Church there is a very large body of ecclesiastical jargon employed by priests, and for most of this church's history the Mass would be performed in Latin, rather as if priests were trying to make the words spoken as hard to understand as possible. Mystifying obscurantism is a very prominent feature in many tribes of scientists. It often seems as if scientists were trying to write their papers so that only other scientists (or very well-read layman) could understand them. In theoretical physics and cosmology, mystifying obscurantism reigns supreme. Papers on topics such as string theory and cosmic inflation theory are typically written as if they were designed to be understood by as few people as possible. It is quite possible to write papers with complex equations in a way that even layman can understand, by very carefully documenting each and every symbolic term that is used, and giving numerical examples that clarify the mathematics. But such clarity is avoided in the vast majority of papers on topics such as string theory and cosmic inflation theory.

Sexism

Not mentioned in the visual above (for lack of space) is the similarity that sexism has been prominent among both the clergy and scientists. In the Catholic Church woman have always been excluded from roles as priests, bishops, cardinals or popes. Even in Protestant churches only about 10% of congregations are led by women. In scientific academia sexism has for a very long time been a problem. In various branches of scientific academia there has been an "old boy's club" atmosphere in which women were often regarded as inferiors. An "old boy's club" is defined as "a network of privileged men who are members of the same organizations and institutions and who assist each other in professional advancement." Doing a Google search for "sexism in scientific academia" will produce first-hand accounts by women describing being treated differently than men.

The Inaccuracy of Narratives Claiming Scientists and Clergymen Are Polar Opposites

There is an extremely common narrative stated repeatedly by scientists, one that claims that scientists and clergymen are kind of polar opposites. What typically occurs is this:

(1) First, the narrative will start out by describing clergy in a stereotypical way, a way that makes the clergy sound like persons of blind faith who pay no attention to evidence, and who believe only according to tradition or acts of faith involving no study of evidence.

(2) Then the narrative will describe an idealized portrait of the noble truth-seeking scientist. The scientist will be described as some impartial judge of truth, who calmly weighs matters purely according to the latest and greatest evidence. The scientist will be described as someone ever-ready to discard his previous beliefs when some new evidence appears contradicting such beliefs. The scientist will be described as someone ready to stand against authority, and the example of Galileo will often be used.

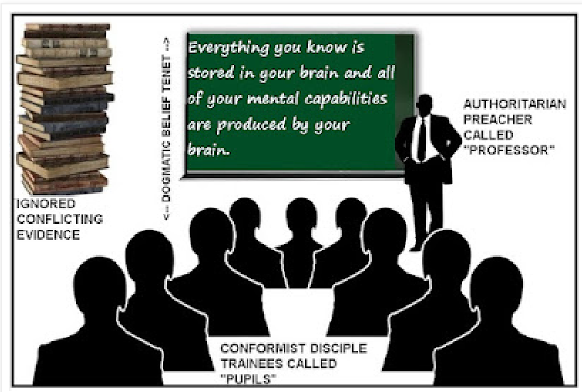
Such a narrative is very misleading. For one thing, it isn't actually true that members of the clergy have no interest in defending their beliefs with evidence. For example, anyone looking at the many volumes of the New Catholic Encylopedia will see innumerable articles written by clergymen scholars very interested in using evidence to back up their belief claims. Protestant clergy also like to use evidence to back up their claims. For example, a minister may claim that this or that event fulfills some prophecy made in the Bible; and Protestant ministers like to cite witness testimony of "born-again" believers or faith healing testimony as evidence to back up their theological claims.

Secondly, the modern scientist is very often no impartial judge of truth, but more like some juror bribed to favor some particular verdict. Unlike a judge who can rule in whatever way he wants with little fear of repurcussions, the modern scientist is very often an Organization Man who fears above all the disfavor of his colleagues. Just as a clergy member strives to produce work products (sermons, articles and books) that will be approved by his fellow clergymen and his superiors in his ecclesiastical organization, the modern scientist tends to be someone who strives to produce work products (class lessons, papers and books) that will be approved by his peers and superiors in his particular tribe of scientists. In particular:

- A scientist will tend to write research proposals that agree with whatever belief traditions are popular with his peers and superiors, which will maximize his chance of being granted research money, which is doled out by members of his own scientist belief community, some little tribe of academia.
- A scientist will tend to write papers that agree with whatever belief traditions are popular with his peers and superiors, to maximize his chance of passing the "peer review" needed for paper publication.
- A scientist will tend to teach classes and write books that agree with whatever belief traditions are popular with his peers and superiors, so that he maximizes his chance of getting favorable "book blurbs" from fellow scientists, and maximizes his chance of being granted academic tenure by a vote of his fellow scientists.
- A scientist will tend to interpret observational data (and describe observational results) in a way that will maximize his chance of being able to claim some important or positive result, so that his chances of getting a paper published in a journal is maximized, and

so that his chance of getting the greatly-sought "high citation count" will be maximized.
- Very many scientists and physicians have financial entanglements (direct or indirect) with corporations that make products or provide services related to claims that the scientists are judging.

So just as the clergyman has all kinds of social conformity reasons and economic reasons why he may tend to speak in some particular way, a scientist has all kinds of social conformity reasons and economic reasons why he may tend to speak in some particular way.



In his paper "The Scholarly Atmosphere: A Magnificent Deception?" (well worth a full read) Neil J. Flinders makes some pertinent points:

"Scholarship is entangled in a magnificent deception; quietly generation after generation is led into mindsets that function as religious orders without their being recognized as such....All universities, in addition to housing the tools of scholarship, function as religious solariums where devotees of selected orders and potential members for these 'sacred' orders gather together in a clustered if not cloistered community. These are individuals dedicated to or in search of some means of transformation, whether it be actualization, recognition, certification, graduation or some other academic symbol or process. The search, when dutifully followed, results in subtle or overt commitments that invite the scholar to give singular recognition to a particular mental paradigm accepted by the community....Characteristically, academic work is ritual work in the service of some belief system--overtly or covertly....Each scholar's fundamental allegiance, loyalty, and commitment resides in some 'church'; and the scholar, like the laborer, cannot serve two masters equally....Characteristics common to such recognized religions as Judaism, Christianity, Islam or Hinduism are clearly discernible in their literature and in the behavior of the respective disciples. And the same general characteristics are equally self evident in the literature and disciples of physical science, social science, linguistics, law, medicine, and other forms of scholarship. These parallel orders display similar if not identical elements; robes, rituals, sacrifices, rites of entry and levels of priestly authority....The experience of a committed graduate student and a novitiate in any of the traditional religious orders are very similar. The focus and sacrifice, submission and performance, obstacles and language, ceremonies and rewards are common components. And the places assigned in the resulting hierarchy reflect a shared pattern....Meetings, numerous and regular meetings, are conducted to define, disseminate, and direct the work of these

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

ministries of modern academe. Prospective members are recruited, instructed, and formally accepted into the various orders. This process seems very normal, natural and easy to accept because the 'new orders' are not called religions; they are perceived as secular scholarly associations....Recognition and advancement are ceremoniously bestowed. Loyalty, commitment, and devotion to the order are prescribed and carefully monitored. Once accepted, adherents are expected to be supportive witnesses and valiant defenders of their designated 'faith'...Among the 'churches' that emerge around scholars a common article of faith is that each of these orders insists on being its own highest court of appeal; its own expertise is the supreme authority in its chartered domain. All who question this authority are pretenders to a throne which holds unquestioned dominion. As scholars build these 'churches' unto themselves, they function as laws unto themselves."

It is interesting to compare a dogma maintained by the clergy and a dogma maintained by one of the many tribes of scientists, the community of neuroscientists. The Christian clergy believe in the dogma of the resurrection of Jesus. The empirical evidence for this claim is not as strong as such clergy would like, consisting of accounts (the Gospels) written decades after the death of Jesus. But at least there is no evidence contradicting such a claim, because no one ever claimed to have seen a deteriorated body of Jesus long after his crucifixion. But neuroscientists believe things that are not just weakly supported by evidence, but actually very much contradicted by very much observational evidence discussed on this blog. For example, neuroscientists typically claim that memories are stored in synapses, a claim highly inconsistent with numerous observational facts, including these:

- the short lifetimes of the proteins that make up synapses, which are known to have average lifetimes of only a few weeks or less, a span of time about 1000 times shorter than the longest length of time that humans can remember things;
- the short lifetimes of the dendritic spines that synapses are typically attached to, which are unstable things typically lasting no longer than a few months;
- the fact that humans can instantly form complex new memories, something that cannot be explained by the "synapse strengthening" evoked by neuroscientists as an explanation for memory formation, because such strengthening requires protein synthesis taking many minutes;
- the fact that many humans can perfectly recall very large bodies of information such as 6000+ scriptural verses (as discussed here), a fact inconsistent with the known unreliability of synaptic transmission (a scientific paper says "We have confirmed that synaptic transmission at excitatory synapses is generally quite unreliable, with failure rates usually in excess of 0.5");
- the complete failure of any scientist to ever discover complex learned information (such as historical information or episodic memory information) by microscopically examining any synapse or any other part of the brain;
- the complete failure of any scientist to ever discover anything like a neural code or codes that would be needed to allow the storage of complex conceptual information and episodic memory information in human brains;

- the complete failure to ever observe any mechanism in the brain capable of reading information from synapses or writing information to synapses;
- the fact that humans can instantly recall much complex relevant learned information after hearing a single word, despite the lack of any kind of addressing or index or position notation system in synapses or anywhere in the brain that might allow such instant recall;
- the ability of humans to form new, lengthy and highly persistent memories during near-death experiences occurring during cardiac arrest when the brain very rapidly flatlines in a way that should be preventing any neural formation of memories.

Dogmatically clinging to such a belief in synaptic memory storage despite so much evidence contradicting it, and always speaking as if such an empirically discredited dogma is fact, neuroscientists may sometimes seem to rather act more like ministers than ministers, more like clergy than clergy, and more like priests than priests. And what about all the scientists who believe in some multiverse infinity of other physical universes, none of which anyone has ever reported observing? Are such scientists more "men of faith" than clergy repeating claims of miracles that at least some people reported seeing long ago?

at December 04, 2022 No comments:

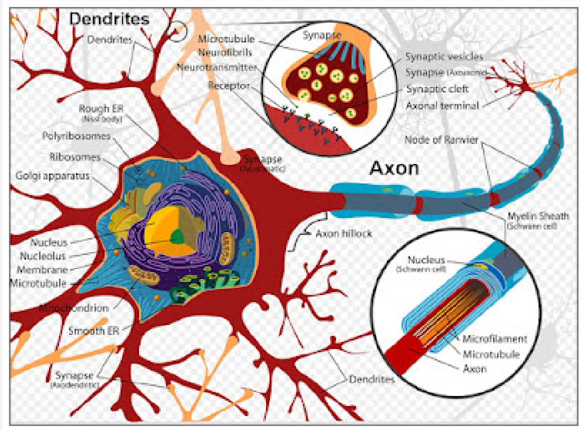
Labels: sociology of science

Sunday, November 27, 2022

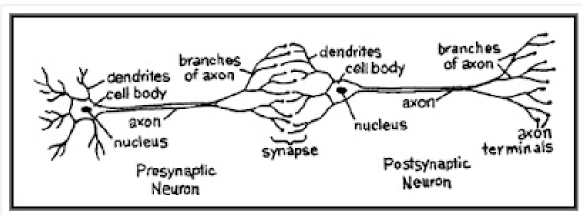
Exceptionally Fast Thinking Cannot Be Explained by Slow Brains Like We All Have

Information travels about in a modern computer at a speed thousands of times faster than nerve signals travel in the human brain. If you type in "speed of brain signals" into the Google search engine, you will see in large letters the number 286 miles per hour, which is a speed of 128 meters per second. This is one of many examples of a dubious claim which sometimes pops up in a large font at the top of the Google search results. The particular number in question is an estimate made by an anonymous person who quotes no sources, and one who merely claims that brain signals "can" travel at such a speed, not that such a speed is the average speed of brain signals. There is a huge difference between the average speed at which some distance will be traveled and the maximum speed that part of that distance can be traveled. For example, while you may briefly drive at 40 miles per hour while traveling through Manhattan or Paris, your average speed will be much, much less because of traffic lights and stop signs.

A speed such as about 100 meters per second is the maximum speed at which such a nerve signal can travel, when a nerve signal is traveling across what is called a myelinated axon. Below we see a diagram of a neuron. The axons are the tube-like parts in the diagram below.



The less sophisticated diagram below makes it clear that axons make up only part of the length that brain signals must travel.



There are two types of axons: myelinated axons and non-myelinated axons (myelinated axons having a sheath-like covering shown in blue in the diagram above). According to this article, non-myelinated axons transmit nerve signals at a slower speed of only .5-2 meters per second (roughly one meter per second). We are told that higher thought comes from the cortex of the brain. But most of the axons in the cortex are not myelinated.

Nerve signals must also travel across dendrites and synapses, which we can see in the diagrams above. It turns out that nerve signal transmission is much slower across dendrites and synapses than across axons. To give an analogy, the axons are like a road on which you can travel fast, and the dendrites and synapses are like traffic lights or stop signs that slow down your speed.

According to neuroscientist Nikolaos C Aggelopoulos, there is an estimate of 0.5 meters per second for the speed of nerve transmission across dendrites (see here for a similar estimate). That is a speed 200 times slower than the nerve transmission speed commonly quoted for myelinated axons. According to Bratislav D. Stefanovic, MD, the conduction speed across dendrites is between .1 and 15 meters per second. Such a speed bump seems more important when we consider a quote by UCLA neurophysicist Mayank Mehta: "Dendrites make up more than 90 percent of neural tissue." Given such a percentage, and such a conduction speed across dendrites, it would seem that the average transmission speed of a brain must be only a small fraction of the 100 meter-per-second transmission in myelinated axons.

Besides this “speed bump” of the slower nerve transmission speed across dendrites, there is another “speed bump”: the slower nerve transmission speed across synapses (which you can see in the top “close up” circle of the first diagram above). There are two types of synapses: chemical synapses and electrical synapses. The parts of the brain allegedly involved in thought and memory have almost entirely chemical synapses. (The sources here and here and here and here and here refer to electrical synapses as "rare." The neurosurgeon Jeffrey Schweitzer refers here to electrical synapses as "rare." The paper here tells us on page 401 that electrical synapses -- also called gap junctions -- have only "been described very rarely" in the neocortex of the brain. This paper says that electrical synapses are a "small minority of synapses in the brain.")

There is a scientific term used for the delay caused when a nerve signal travels across a synapse. The delay is called the *synaptic delay*. According to this 1965 scientific paper, most synaptic delays are about .5 milliseconds, but there are also quite a few as long as 2 to 4 milliseconds. A more recent (and probably more reliable) estimate was made in a 2000 paper studying the prefrontal monkey cortex. That paper says, "the synaptic delay, estimated from the *y*-axis intercepts of the linear regressions, was 2.29" milliseconds. It is very important to realize that this synaptic delay is *not* the total delay caused by a nerve signal as it passes across different synapses. The synaptic delay is the delay caused *each and every time* that the nerve signal passes across a synapse.

Such a delay may not seem like too much of a speed bump. But consider just how many such "synaptic delays" would have to occur for, say, a brain signal to travel from one region of the brain to another. It has been estimated that the brain contains 100 trillion synapses (a neuron may have thousands of them). So it would seem that for a neural signal to travel from one part of the brain to another part of the brain that is a distance away only 5% or 10% of the length of the brain, that such a signal would have to endure many thousands of such "synaptic delays" requiring a total of quite a few seconds of time.

Humans can recall information instantly given a one-word prompt, but such an ability is inexplicable given the physical limitations of brains. We know the type of things that make instant data retrieval possible in computers: features such as indexing, sorting and addressing. The brain has no such features. Given its physical nature, trying to remember anything by retrieving information from a brain would be like trying to find a needle in a haystack.

Because of all of these reasons, it seems that brains are far too slow to explain normal fast thinking and normal fast recall. Human recall of learned information typically occurs instantaneously. We see this on the show "Jeopardy," where contestants typically give correct answers within a second or two after being prompted about obscure information. For example, when read the prompt "The battle that had a fateful mistake known as Pickett's Charge," contestants within 1 second may start to answer "What is Gettysburg?" And if I ask some old people "Which US president succeeded Jimmy Carter?" it will take only a second before I hear an answer of "Reagan."

Humans can also think very fast. There are many historical cases of math prodigies that could calculate with incredible speed and accuracy. The passage below describes the blazing fast calculation powers of Zerah Colburn:

"This child undertook, and completely succeeded in, raising the number 8 progressively up to the sixteenth power. And in naming the last result, viz.: 281, 474, 976, 710, 656, he was right in every figure. He was then tried as to other numbers consisting of one figure, all of which he raised (by actual multiplication, and not by memory) as high as the tenth power, with so much facility and dispatch that the person appointed to take down the results was obliged to enjoin him not to be so rapid. With respect to numbers consisting of two figures, he would raise some of them to the sixth, seventh and eighth

power....He was asked the square root of I06,929, and before the number could be written, he immediately answered, 327. He was then required to name the cube root of 268,336,125, and with equal facility and promptness he replied, 645. Various other questions of a similar nature, respecting the the roots and powers of very high numbers, were proposed by several of the gentlemen present, to all of which he answered in a similar manner. One of the party requested him to name the factors which produced the number 247,483: this he immediately did by mentioning the numbers 941 and 263 — which, indeed, are the only two numbers that will produce it...One of the gentlemen asked him how many minutes there were in forty-eight years; and before the question could be written down, he replied 25,228,800; and instantly added that the number of seconds in the same period was 1,513,728,000."

The passage below tells us about the incredibly fast calculation speed of Jacques Inaudi, born in 1867:

"In his exercises of mental calculation, Mr. Inaudi is remarkable in two particulars, the complexity of his work and the rapidity with which he completes it. The greater number of questions given to him contain many figures. He will add in his head two numbers consisting of twelve figures each ; he will multiply two numbers composed of eight figures ; he will tell how many seconds there are in any promiscuously chosen number of years, months, days, and hours. These operations demand that he shall hold in his memory the exact problem and the partial solutions up to the time when the complete result is found. For such a considerable work as this, Mr. Inaudi gives an extremely short time, so short, indeed, as sometimes to produce the illusion of instantaneity. The following paragraph has been published concerning him. ' He adds in a few seconds seven numbers of eight or ten figures each; he subtracts one number from another each composed of twenty-one figures in less than a minute; he finds as rapidly the square root or the cube root of numbers consisting of from eight to twelve figures, if these numbers are perfect squares or cubes; it takes a little longer for the last-named work if there is a remainder necessitating a fractional part to the answer. He finds with incredible celerity the sixth or the seventh root of large numbers. He will multiply or divide in less time than it takes him to announce the results. As an example of what has been said, we give the following: He was asked the number of seconds in 18 years, 7 months, 21 days and 3 hours. The response was given in thirteen seconds."

In the twentieth century the legendary mathematician John von Neumann was famous for his lightning-fast problem solving abilities. When he was six years old, he could divide two eight-digit numbers in his head. The wikipedia.org article on him mentions some of the greatest thinkers of his time saying that von Neumann was the fastest thinker they had ever met. We read this story about a problem posed to von Neumann:

"Two bicyclists start 20 miles apart and head toward each other, each going at a steady rate of 10 mph. At the same time a fly that travels at a steady 15 mph starts from the front wheel of the southbound bicycle and flies to the front wheel of the northbound one, then turns around and flies to the front wheel of the southbound one again, and continues in this manner till he is crushed between the two front wheels. Question: what total distance did the fly cover? ...When the question was put to von Neumann, he solved it in an instant, and thereby disappointed the questioner: 'Oh, you must have heard

the trick before!' 'What trick?' asked von Neumann, 'All I did was sum the geometric series.' "

Neelakantha Bhanu Prakash has been called the world's fastest calculator, and can do things such as multiply 869,463,853 times 73 correctly in only 26 seconds, giving an answer of 63,470,861,269. This is despite having a very serious head injury which required 86 stitches, and left him with a prominent scar on his forehead. According to the Guinness Book of World Records, "Scott Flansburg of Phoenix, Arizona, USA, correctly added a randomly selected two-digit number (38) to itself 36 times in 15 seconds without the use of a calculator on 27 April 2000 on the set of Guinness World Records in Wembley, UK."

The book *Bright Splinters of the Mind* by Beate Hermelin is about autistic savants, those with special skills despite seeming to be largely defective in some areas of mental functioning. On page 63 of the book we read this about a gifted subject: "Christopher can understand, talk, read, write and translate from Danish, Dutch, Finnish, French, German, Greek, Hindi, Italian, Norwegian, Polish, Portuguese, Russian, Spanish, Swedish, Turkish and Welsh." On page 300 the book mentions twins who could recall up to 300 digits. On page 17 the author reports being introduced to a 13-year-old boy who immediately asks him his birthday:

"When I told him it was 7 August, he said instantly, 'That was on a Wednesday in 1940, and in 2004 it will be on a Wednesday again.' I was stunned, and of course had no idea whether he was right. (He was!)"

Quite a few such accounts of instantaneous human calendar calculation are found in this book and a book by Darold A. Treffert. Below are statements made by Treffert in his very interesting book *Extraordinary People: Understanding Savant Syndrome*:

- In 1788 the slave Thomas Fuller (who could neither read nor write) was asked "How many seconds has a man lived who is 70 years, 17 days and 12 hours old?" 90 later seconds Fuller gave a correct reply of 2,210,500,800. His obituary stated that "he could give the number of months, days, weeks, hours, minutes, and seconds in any period of time that any person chose to mention, allowing in his calculation for all the leap years that happen in the time."
- A Dr. J. Langdon Down described a 12-year-old boy who could multiply any three numbers by any other three numbers, as quickly as Down could write the six numbers on paper.
- A Dr. Alfred F. Tredgold mentioned a person who could give the square root of any four digit number in an average of four seconds, and who could give the cube root of any six-digit number in about six seconds. He said that when the same person "was asked about how many grains of corn there be in any one of 64 boxes, with 1 in the first, 2 in the second, 4 in the third, 8 in the fourth, and so on, he gave answers for the fourtheenth (8,192), for the eighteenth (131,072), and the twenty-fourth (8,388,608) instantaneously, and he gave the answer for the forty-eighth box (140,737,488,355,328) in six seconds," and that he "also gave the total in all 64 boxes correctly (18,446,734,073,709,551,615) in forty-five seconds."

- A blind boy named Fleury was of such low intelligence he had to be institutionalized, but he could calculate 2 to the 30th power (1,073,741,824) in only 40 seconds, and could calculate the cube root of 465,484,375 (which is 775) in 13 seconds.
- A pair of twins named George and Charles (born three months prematurely) could do calendar calculations with blazing speed. We read this: "Give them a date and they can give you day of the week over a span of 80,000 years, 40,000 backward or 40,000 forward." Also, we read that if you "ask them to name in which years in the next 200 (or any 200) Easter will fall on March 23," then they "will name those years with lightning rapidity, faster than a computer and just as accurately." This seems all the more impressive when you consider that the rules for when Easter will occur in a particular year are quite complicated. In the same chapter we read about other people who could do calendar calculations with blazing speed.

Treffert's book is filled with cases like these: cases of people who think way, way faster than should be possible with a brain such as humans have, and cases of people who remember way, way better than should be possible with brains such as ours, having none of the main characteristics of manufactured information storage systems such as computers. Many of these people had severe brain damage. But Treffert failed to put two and two together in this matter. On page 207-208 he asks some questions that should raise doubts about claims of neural memory storage. We read this set of questions about human memory:

"Is storage electrical? If so, then why aren't memories permanently destroyed during an epileptical seizure, which is truly an electrical storm in the brain -- as can be witnessed by watching an EEG during a seizure? Or, if storage is electrical, why aren't memories permanently affected when a patient receives electroconvulsive therapy (ECT), during which time an electrical current is passed through the brain ? If storage is electromagnetic in the same manner that storage of 'memories' on tape or storage of data on a computer is, then why isn't memory permanently affected by a nuclear magnetic resonance (NMR) brain scan, during which the brain is subjected to tremendous magnetic fields? Try that with some tapes or disks. If storage is an actual physical storage, like grooves on a phonograph disk, why isn't there some clear evidence of that process in microscopic examination of the brain?"

I wish this quote could be posted on the wall of every neuroscientist. Alas, Treffert failed to ponder the implications of his own questions. On page 208, he says "These, and many more, are questions I guess we will need to leave for the future"; and then in the rest of the book he just keeps spouting conventional neuroscience dogmas about memories storing brains. Treffert should have concluded from his own questions and the case histories he reported (often involving heavily brain-damaged people with blazing fast minds or exceptionally powerful memories) that the brain is not the source of human minds, and not the storage place of human memories.

To find cases of human mental performance that should be utterly impossible given the physical limitations of the brain, you do not need to delve into the literature documenting paranormal phenomena (although doing that will yield a huge number of such cases). You can merely search for the most remarkable cases of mental performance that are not disputed. Besides searching for cases of exceptionally fast thinking, you can search for cases of exceptional memory. Below is a quote from page 53 of the book *The Mind and Beyond* published by Time-Life Books:

"As reported in the 1990 edition of the Guinness Book of World Records, in 1967, one Mehmed Ali Halici of Turkey recited from memory 6,666 verses of the Koran in six hours. And in 1989, Englishman Tony Power memorized in correct order a random sequence of thirteen packs of shuffled playing cards – 676 cards in all – after looking at them only once. But the world record for a single eidetic memory feat may be held by Bhandanta Vicitasara of Rangoon, Burma who in 1974 correctly recited from memory 16,000 pages of Buddhist canonical texts."

Mehmed Ali Halici's recitation rate was so fast it was faster than a normal person speaking as fast as he can. This was six hours of memory recall at a rate that was basically instantaneous. A hundredth of such speed would have been impossible given a brain with all the speed limits mentioned above. The fast recall of a single page of memorized text is not explainable under the dogmas of neuroscientists, who have no credible explanation as to how a brain could store a single page of text, no explanation of how memories could be preserved for years, and no explanation of how memorized information could be instantly retrieved in brains lacking any of the things that make fast recall possible (such as addressing, sorting and indexes). Not one single word has ever been found stored in brain tissue by examining brain tissue.

There is no neuroscientist in the world who can give a detailed credible explanation of how a human brain could even store the mere phrase "my dog has fleas," giving a precise worked example showing how each one of those characters could be stored in a brain. When neuroscientists talk about memories being stored by "alteration in connection patterns" or "synapse strengthening," they are engaging in mere hand waving. As Treffert asked, "If storage is an actual physical storage, like grooves on a phonograph disk, why isn't there some clear evidence of that process in microscopic examination of the brain?" The very likely answer is: because brains do not store information humans memorize.

at November 27, 2022 No comments:

Labels: brain signal speed, exceptional memory, exceptional speed of thinking, memory recall

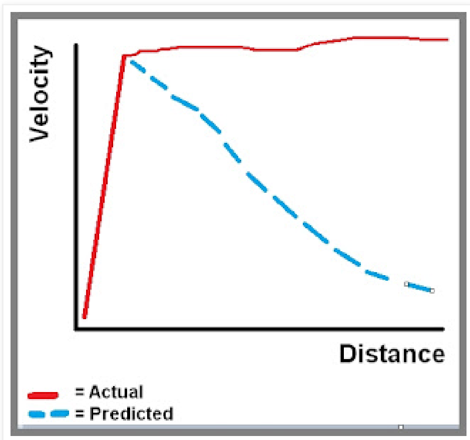
Sunday, November 20, 2022

If Neuroscientists Acted Like Cosmologists, They Might Say You Have an Invisible "Dark Brain"

From a sociological perspective the academia tribe of neuroscientists has many similarities with the academia tribe of cosmologists (scientists who study the universe as a whole). Both are belief communities zealously committed to advancing unproven dogmas. The unproven dogmas of the neuroscientist belief community include the dogma that the brain is the source of the mind (or the same thing as the mind), and the belief that memories are stored in the brain. The unproven dogmas of the cosmologist belief community include a belief in primordial cosmic inflation (the idea that the universe underwent exponential expansion for an instant at its beginning), the dogma of dark matter and the dogma of dark energy.

But there is one important difference between these belief communities: cosmologists have shown a willingness to postulate the existence of invisible realities to try to make up for things they cannot explain, but neuroscientists refuse to do such a thing, clinging to a "the brain explains it all" dogma that dramatically fails to account for observational reality. To explain this difference, let me describe why cosmologists claim that there is dark matter and dark energy.

What led to the belief in dark matter was the discrepancy shown in the visual below. Astronomers thought that the rotation velocity of stars (the speed at which they rotate around the center of the galaxy) should decrease the more the stars are located from the center of a galaxy (which would be the behavior shown by the blue line below). But instead stars rotated around the center of their galaxy with the speed shown in the red line.



Unable to account for such observations by anything they knew of in the visible universe, cosmologists postulated the existence of an invisible: "dark matter" existing in greater amounts than ordinary matter. Something rather similar led to cosmologists postulating the idea of dark energy. Scientists seemed to observe the universe expanding at an accelerating rate they could not account for by using only the known matter and energy in the universe. To account for the rate of the universe's expansion, scientists began to postulate that most of the universe's mass-energy exists in the form of a mysterious "dark energy" that acts as a "cosmological constant," a kind of repulsive force.

A scientific web site explains dark energy like this (failing to see the irony of matter-of-factly making an exact "72%" claim about a merely hypothetical substance):

"Dark Energy is a hypothetical form of energy that exerts a negative, repulsive pressure, behaving like the opposite of gravity. It has been hypothesised to account for the observational properties of distant type Ia supernovae, which show the universe going through an accelerated period of expansion. Like Dark Matter, Dark Energy is not directly observed, but rather inferred from observations of gravitational interactions between astronomical objects. Dark Energy makes up 72% of the total mass-energy density of the universe."

We see in these examples cosmologists seeming to act according to a principle like this: "If what you have directly observed cannot credibly account for what we see in nature, then be willing to postulate some very important mysterious invisible reality that cannot be directly observed." But neuroscientists refuse to follow such a principle. Nature gives us innumerable examples of mental phenomena that cannot be credibly explained by brains (phenomena discussed in the posts of this blog). But rather than intelligently postulating some mysterious reality beyond the brain, our neuroscientists just keep senselessly claiming that the brain explains everything.

But what if neuroscientists were to act according to the same principle quoted above? Then we might read a conversation something like the imaginary conversation below:

Science journalist*: We are here with Professor Smith, and I will ask him about his interesting theory of a "dark brain." Professor Smith, what is this "dark brain" that you postulate?*

Professor Smith: *What I call the dark brain is a mysterious invisible reality that must exist in each of our bodies, in addition to our visible brains. I believe that the dark brain is made of some kind of matter or energy that we cannot directly observe.*

Science journalist: *Why do we need to postulate such a "dark brain"? Why can't we just assume that there only exists the regular physical brain that doctors see when they open up someone's skull?*

Professor Smith: *There are all kinds of powerful reasons. One reason is that the known physical brain cannot account for memory formation and memory persistence. Humans can remember things very well for fifty or sixty years, but there's nothing in the known physical brain that can account for that. The reigning theory is that memories are stored in synapses, but that's ridiculous, because the proteins in synapses only last for a few weeks, and synapses are attached to dendritic spines that don't last for years. There's also nothing in the known physical brain that can account for instant memory formation. Don't tell me that's "synapse strengthening," which would take minutes or hours. We've examined synapses with the most powerful microscopes. No one has ever found a human memory by microscopically observing synapses or any part of the physical brain. We can't even find any information storage code in the known physical brain, outside of the genetic code used by the DNA of all cells, which only has chemical information, not conceptual or memory information.*

Science journalist: *But at least the known physical brain can explain memory recall, right?*

Professor Smith: *Not at all. Humans can recall complex learned information instantly, given a single word. For example, if you say "Waterloo," I may instantly say "A battle in 1815 in which Napoleon Bonaparte suffered his final military defeat." But how could I retrieve such information instantly, using a visible physical brain lacking any of the things that make instant information recall possible? It would be like finding a needle in a haystack. We know from our work with computers the kind of things that a system needs to be able to instantly retrieve information: things like addressing, sorting and indexing. No such things exist in the visible physical brain.*

Science journalist: *So if we imagine this "dark brain" we can account for some things that the known physical brain cannot explain?*

Professor Smith: *Yes, exactly. There are all kinds of other things we observe that we cannot explain with the mere idea of the known physical brain.*

Consider out-of-body experiences. People often report floating out of their bodies and observing their bodies from above such bodies, particularly during near-death experiences. There's no credible way to account for that using a physical brain trapped in your skull. But you can account for it assuming that someone's invisible dark brain can leave his body. Then there's the well-documented reality of ESP. You can't account for extrasensory perception with the known physical brain. But such a thing could be possible if we each have an invisible dark brain that has powers and limits we don't understand.

Science journalist: *So has someone photographed such a "dark brain"?*

Professor Smith: *No, presumably because it's made of some kind of energy or matter we can't currently measure or photograph with our current instruments.*

Science journalist: *But is it scientific to postulate some important causal reality is invisible?*

Professor Smith: *Of course it is. That's what cosmologists and astrophysicists do constantly. Such scientists are always appealing to some invisible and mysterious "dark matter" and "dark energy" to account for things they can't explain. If cosmologists and astrophysicists can do that, why can't neuroscientists do something very similar, by postulating a dark brain that is not directly observable?*

Science journalist: *But what could be the cause of such a "dark brain"?*

Professor Smith: *We don't know. There could conceivably be some natural cause of dark brains. But if there was a natural cause, dark brains would have to have originated through some way unlike anything evolutionary biologists or developmental biologists understand.*

The imaginary Professor Smith might have great success in advancing such a theory, just as long as he kept using this term "dark brain" and avoided using the term "soul" or "spirit," which would mean basically the same thing. Neuroscientists might well be willing to believe in something exactly the same as what the common person understands under the names of "soul" or "spirit," as long as such a thing was described using the term "dark brain." But neuroscientists senselessly refuse to believe in such a thing (despite so many reasons for believing in it) as long as someone uses the terms "soul" or "spirit." It's like there is a tribal taboo that neuroscientists are committed to, one that unreasonably forbids them from using the words "soul" or "spirit."

at November 20, 2022 2 comments:

Sunday, November 13, 2022

The US Government's False Claims About DNA

What I call the Great DNA Myth is a false teaching that continues to be spread by innumerable parties in the world of biology, even though there are very many other authorities in that same world who are telling us the teaching is false. The Great DNA Myth is the myth that inside DNA is some blueprint or recipe that specifies how to make a human body.

There are various ways in which this false idea is stated, all equally false:

- Someone may describe DNA or the genome as a blueprint for an organism.
- Someone may describe DNA or the genome as a recipe for making an organism.
- Someone may describe DNA or the genome as a program for building an organism.
- Someone may claim that DNA or genomes specify the anatomy of an organism.
- Someone may claim that genotypes (the DNA in organisms) specify phenotypes (the observable characteristics of an organism).
- Someone may claim that genotypes (the DNA in organisms) "map" phenotypes (the observable characteristics of an organism) or "map to" phenotypes.
- Someone may claim that DNA contains "all the instructions needed to make an organism."
- Someone may claim that there is a "genetic architecture" for an organism's body or some fraction of that body.
- Using a little equation, someone may claim that a "genotype plus the environment equals the phenotype," a formulation as false as the preceding statements, since we know of nothing in the environment that would cause phenotypes to arise from genotypes that do not specify such phenotypes.

Weaker formulations of this false idea include claims that DNA is "life's instruction book" or "the key to life" or "the book of life" or "the secret of life." While such rather vague assertions are not as explicitly false as the statements in the bullet list above, such formulations are equally misleading, as they insinuate the false claims in such a bullet list. Variations on these false statements above may use the term "genes" rather than DNA or genome. Such statements are equivalent to the statements above, because a gene is merely part of DNA (human DNA consists of roughly 20,000 genes).

There is no truth to the claim that DNA is a specification for anatomy. DNA merely specifies low-level chemical information such as which sequences of amino acids make up polypeptide chains that are the starting points of protein molecules. Many biology authorities (some of which I quote below) have confessed this reality that DNA does not specify anatomy. But the "useful stooge" that is the Great DNA Myth continues to be taught or suggested in the literature of biology by many other people. So now we have a very strange situation that might be described like this: biology's left hand is writing one thing, and biology's right hand is writing the opposite.

The US Government's Fictions About DNA

False claims about DNA are found not only in the literature of many biologists, but in some of the official proclamations of the US federal government. Examples can be found at the government site www.genome.gov. Below are some examples:

(1) At the government page here (https://www.genome.gov/about-genomics/about-genomics/educational-resources/infographics/Your-Genome-You) we are incorrectly told "The genome contains all the instructions for you to grow throughout your lifetime." This is not true. A genome (a person's DNA) merely specifies low-level chemical information, and does not specify how the progression from a tiny speck-sized zygote to a full adult body can

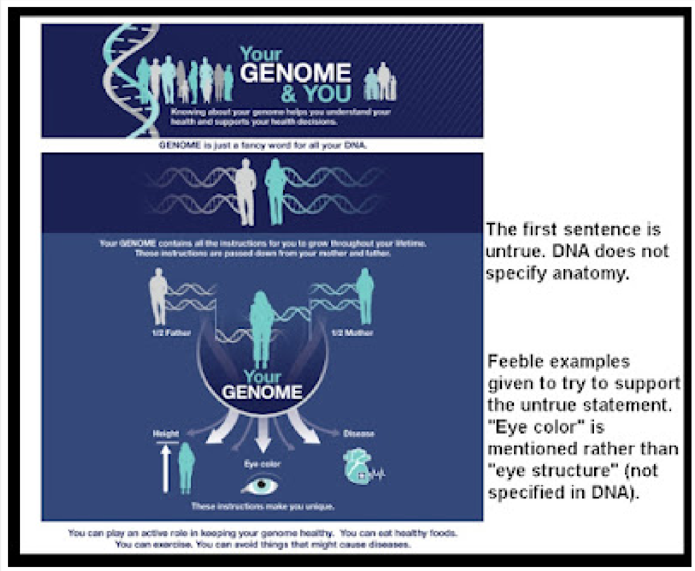
occur. No instructions on how to build a human body are found in DNA, which does not even specify how to make any of the roughly 200 types of cells in the human body.

(2) The US government page here (https://www.genome.gov/about-genomics/fact-sheets/Deoxyribonucleic-Acid-Fact-Sheet) misleadingly states that "the complete DNA instruction book, or genome, for a human contains about 3 billion bases and about 20,000 genes on 23 pairs of chromosomes." In this sentence DNA is referred to as if it an instruction book for making a human. DNA is no such thing. All it contains is low-level chemical information, such as which amino acids make up particular proteins. The same page misleads us when it states this: "DNA contains the instructions needed for an organism to develop, survive and reproduce." DNA does have any instructions for how a full human body can develop from a speck-sized fertilized zygote, and DNA does not tell us anything about what we need to survive or reproduce.

(3) Another US government page (https://www.genome.gov/about-genomics/fact-sheets/A-Brief-Guide-to-Genomics) here falsely tells us that "Deoxyribonucleic acid (DNA) is the chemical compound that contains the instructions needed to develop and direct the activities of nearly all living organisms." DNA does not have instructions specifying the anatomical organization of a human, and does not "direct the activities of nearly all living organisms." DNA lists the structure of some chemicals you need; it does not direct your activities. The same page contains the untrue claim that "DNA contains the information needed to build the entire human body." DNA does not specify any anatomical structures in a human, and does not even specify how to make any of the 200 types of cells in they human body. The same page makes the extremely absurd claim that "virtually every human ailment has some basis in our genes." For example, when you get pneumonia or influenza or COVID-19 or many infectious diseases, you have got an ailment that does not have any basis in your genes. And when you are injured in an accident, that has no basis in your genes.

(4) On the page here (https://www.genome.gov/About-Genomics/Introduction-to-Genomics) we get the false claim that "Each genome contains the information needed to build and maintain that organism throughout its life." Genomes (DNA molecules) contain no instructions on how to build an organism or any of its cells. The rest of the page contains some equally misleading misinformation.

(5) On the US government page here (https://www.genome.gov/outreach/unlocking-lifes-code-exhibition#) we are given a link to the video at https://www.youtube.com/watch?v=kEJ0eRaebIc (here). At the beginning of that video, we have a young boy say, "I have always found it really intriguing that everything about who we are and what we look like is controlled by these tiny molecules called DNA." This extremely false statement is not corrected, just as if the makers of the video wanted you to believe it is true.



A misleading visual on a US government web page

Some Experts Who Told Us the Truth About DNA

Below are some quotes by distinguished biology authorities revealing how false is the US government misinformation about DNA quoted above.

In this .pdf file, a professor of Mathematical Biology makes this statement:

"Although genes obviously play a role in development, knowing the genetic make-up of an organism does not allow us to understand the mechanisms of development—we may know that certain genes impart particular properties to certain cells, but how this then leads to tissue-level behaviour cannot be addressed by genetics."

That is basically a fancy way of saying that a fertilized egg does not become a baby by following a body plan stored in DNA.

On page 26 of the book *The Developing Genome*, Professor David S. Moore states, "The common belief that there are things inside of us that constitute a set of instructions for building bodies and minds -- things that are analogous to 'blueprints' or 'recipes' -- is undoubtedly false." The same expert (in a paper claiming massive misuse by others of the term "heritability") states, "Our DNA, we now know, does not contain specific blueprint-like instructions about traits."

Biologist Rupert Sheldrake says this about this issue:

"DNA only codes for the materials from which the body is constructed: the enzymes, the structural proteins, and so forth. There is no evidence that it also codes for the plan, the form, the morphology of the body. To see this more clearly, think of your arms and legs. The form of the arms and legs is different; it's obvious that they have a different shape from each other. Yet the chemicals in the arms and legs are identical. The muscles are the same, the nerve cells are the same, the skin cells are the same, and the DNA is the same in all the cells of the arms and legs. In fact, the DNA is the same in all the cells of the body. DNA alone cannot explain the difference in form; something else is necessary to explain form."

An evolutionary biologist notes that "the long-held belief that genes are the unique determinants of biological form in development and evolution has been challenged by an extensive number of commentators." Among these "extensive number of commentators" are the people mentioned above and the authors of this scientific paper, who note that "gene expression patterns cannot explain the development of the precise geometry of an organism and its parts in space."

Describing conclusions of biologist Brian Goodwin, the New York Times says, "While genes may help produce the proteins that make the skeleton or the glue, they do not determine the shape and form of an embryo or an organism." Massimo Pigliucci (mainstream author of numerous scientific papers on evolution) has stated that "old-fashioned metaphors like genetic blueprint and genetic programme are not only woefully inadequate but positively misleading." Neuroscientist Romain Brette states, "The genome does not encode much except for amino acids."

In a 2016 scientific paper, three scientists state the following:

"It is now clear that the genome does not directly program the organism; the computer program metaphor has misled us...The genome does not function as a master plan or computer program for controlling the organism; the genome is the organism's servant, not its master....Metaphorically, we can think of the genome as akin to a list of words, a vocabulary, which can be used to build and express a meaningful language; like a vocabulary, a genome by itself has no functional meaning. The genome is thus akin to a toolbox of DNA sequences that provide molecular tools as requested by the internal state of the organism and the state of the environment. One's genes cannot explain one's being: an organism is the expression of a dynamic and ongoing interaction between the state of its environment and its internal state, which includes its past history and its toolbox of DNA sequences."

In the book *Mind in Life* by Evan Thompson (published by the Belknap Press of Harvard University Press) we read the following on page 180: "The plain truth is that DNA is not a program for building organisms, as several authors have shown in detail (Keller 2000, Lewontin 1993, Moss 2003)." C.H. Waddington is described by wikipedia.org as "a British developmental biologist, paleontologist, geneticist, embryologistand philosopher who laid the foundations for systems biology, epigenetics, and evolutionary developmental biology." He stated, "The DNA is not a program or sequentially accessed control over the behavior of the cell." Scientist Jean Krivine presents here a very elaborate visual presentation with the title, "Epigenetics, Aging and Symmetry or why DNA is not a program." Scientists Walker and Davies state this in a scientific paper:

"DNA is not a blueprint for an organism; no information is actively processed by DNA alone. Rather, DNA is a passive repository for transcription of stored data into RNA, some (but by no means all) of which goes on to be translated into proteins."

Geneticist Adam Rutherford states that "DNA is not a blueprint," a statement also made by biochemistry professor Keith Fox. A press account of the thought of geneticist Sir Alec Jeffreys states, "DNA is not a blueprint, he says." B.N. Queenan (the Executive Director of Research at the NSF-Simons

Center for Mathematical & Statistical Analysis of Biology at Harvard University) tells us this:

"DNA is not a blueprint. A blueprint faithfully maps out each part of an envisioned structure. Unlike a battleship or a building, our bodies and minds are not static structures constructed to specification."

"The genome is not a blueprint," says Kevin Mitchell, a geneticist and neuroscientist at Trinity College Dublin. "It doesn't encode some specific outcome." His statement was reiterated by another scientist. "DNA cannot be seen as the 'blueprint' for life," says Antony Jose, associate professor of cell biology and molecular genetics at the University of Maryland. He says, "It is at best an overlapping and potentially scrambled list of ingredients that is used differently by different cells at different times." Sergio Pistoi (a science writer with a PhD in molecular biology) tells us, "DNA is not a blueprint," and tells us, "We do not inherit specific instructions on how to build a cell or an organ." Michael Levin (director of a large biology research lab) states that "genomes are not a blueprint for anatomy," and after referring to a "deep puzzle" of how biological forms arise, he gives this example: "Scientists really don't know what determines the intricate shape and structure of the flatworm's head."

Agustin Fuentes, a professor of anthropology, states the following:

"Genes play an important role in our development and functioning, not as directors but as parts of a complex system. 'Blueprints' is a poor way to describe genes. It is misleading to talk about genes as doing things by themselves."

On the web site of the well-known biologist Denis Noble, we read that "the whole idea that genes contain the recipe or the program of life is absurd, according to Noble," and that we should understand DNA "not so much as a recipe or a program, but rather as a database that is used by the tissues and organs in order to make the proteins which they need."

In statements such as this, scientists "fess up" that the idea of DNA as a human specification is not true. Two other scientists "fess up" in a similar way when they write the following about genes in the journal Nature: "Population genetics is founded on a subset of coding sequences that can be related to phenotype in a statistical sense, but not based on causation or a viable causal mechanism."

Regarding the DNA as blueprint idea wikipedia.org article entitled "Common misunderstanding of genetics" lists the claim that "Genes are a blueprint of an organism's form and behavior" as one of the "common misunderstandings of genetics." Jonathan Latham has a master's degree in Crop Genetics and a PhD in virology. In his essay "Genetics Is Giving Way to a New Science of Life," a long essay well worth a read, Latham exposes many of the myths about DNA being a blueprint or master controller, and points out DNA does not even fully specify a protein. He states, "It is habitually, but lazily, presumed that DNA specifies all the information necessary for the formation of a protein, but that is not true."

Ian Stevenson M.D. cited quite a few biologists pointing out the genes and DNA cannot determine the form of an organism:

"Genes alone - which provide instructions for the production of amino acids and proteins -- cannot explain how the proteins produced by their instructions come to have the shape they develop and, ultimately, determine the form of the organisms where they are. Biologists who have drawn attention to this important gap in our knowledge of form have not been a grouping of mediocrities (Denton, 1986; Goldschmidt, 1952; B. C. Goodwin, 1985, 1988, 1989, 1994; Gottlieb, 1992; Grasse, 1973; E. S. Russell...Sheldrake, 1981; Tauber and Sarkar, 1992; Thompson, 1917/1942)."

Biologist B.C. Goodwin stated this in 1989: "Since genes make molecules, genetics...does not tell us how the molecules are organized into the dynamic, organized process that is the living organism." A paper by Stuart A. Newman (a professor of cell biology and anatomy) discussing at length the work of scientists trying to evoke "self-organization" as an explanation for morphogenesis states that "public lectures by principals of the field contain confidently asserted, but similarly oversimplified or misleading treatments," and says that "these analogies...give the false impression that there has been more progress in understanding embryonic development than there truly has been." Referring to scientists moving from one bunk explanation of morphogenesis to another bunk explanation for it, the paper concludes by stating, "It would be unfortunate if we find ourselves having emerged from a period of misconceived genetic program metaphors only to land in a brave new world captivated by equally misguided ones about self-organization."

Referring to claims there is a program for building organisms in DNA, biochemist F. M. Harold stated "reflection on the findings with morphologically aberrant mutants suggests that the metaphor of a genetic program is misleading." Referring to self-organization (a vague phrase sometimes used to try to explain morphogenesis), he says, "self-organization remains nearly as mysterious as it was a century ago, a subject in search of a paradigm."

Physician James Le Fanu states the following:

"The genome projects were predicated on the reasonable assumption that spelling out the full sequence of genes would reveal the distinctive genetic instructions that determine the diverse forms of life. Biologists were thus understandably disconcerted to discover that precisely the reverse is the case. Contrary to all expectations, there is a near equivalence of 20,000 genes across the vast spectrum of organismic complexity, from a millimetre-long worm to ourselves. It was no less disconcerting to learn that the human genome is virtually interchangeable with that of both the mouse and our primate cousins...There is in short nothing in the genomes of fly and man to explain why the fly has six legs, a pair of wings and a dot-sized brain and that we should have two arms, two legs and a mind capable of comprehending the history of our universe."

The false claim that DNA is a blueprint or recipe for making a human was denounced by Ken Richardson, formerly Senior Lecturer in Human Development at the Open University. In an article in the mainstream Nautilus science site, Richardson stated the following:

"Scientists now understand that the information in the DNA code can only serve as a template for a protein. It cannot possibly serve as instructions for the more complex task of putting the proteins together into a fully functioning being, no more than the characters on a typewriter can produce a story."

Writing in the leading journal *Cell*, biologists Marc Kirschner, John Gerhart and Tim Mitchison stated, "The genotype, however deeply we analyze it, cannot be predictive of the actual phenotype, but can only provide knowledge of the universe of possible phenotypes." That's equivalent to saying that DNA does not specify visible biological structures, but merely limits what structure an organism can have (just as a building parts list merely limits what structures can be made from the set of parts). A paper co-authored by a chemistry professor (Jesper Hoffmeyer) tells us this: "Ontogenetic 'information,' whether about the structure of the organism or about its behavior, does not exist as such in the genes or in the environment, but is constructed in a given developmental context, as critically emphasized, for example, by Lewontin (1982) and Oyama (1985)." A paper by Stuart A. Newman (a professor of cell biology and anatomy) refers to "misconceived genetic program metaphors."

At the Biology Stack Exchange expert answers site, someone posted a question asking which parts of a genome specify how to make a cell (he wanted to write a program that would sketch out a cell based on DNA inputs). An unidentified expert stated that it is "not correct" that DNA is a blueprint that describes an organism, and stated that "DNA is not a blueprint because DNA does not have instructions for how to build a cell." No one contradicted this person's claim, even though the site allows any of its experts to reply. "DNA is not a blueprint for an organism," states Templeton Prize-winning physicist and astrobiologist P. C. W. Davies. On page 26 of his book *Biology as Ideology: The Doctrine of DNA*, biologist Richard C. Lewontin stated this:

"*We are not determined by our genes, although surely we are influenced by them...Even if I knew the complete molecular specification of every gene in an organism, I could not predict what that organism would be....Even if I knew the genes of a developing organism and the complete sequence of its environments, I could not specify that organism."*

The same biologist on page 52 mentions only one of several reasons that can help explain why so many misstatements have been made about DNA, stating this: "Among molecular biologists who are professors in universities, a large proportion are also principal scientists or principal stockholders in biotechnology companies."

Why DNA as Body Blueprint Is a Childish Absurdity

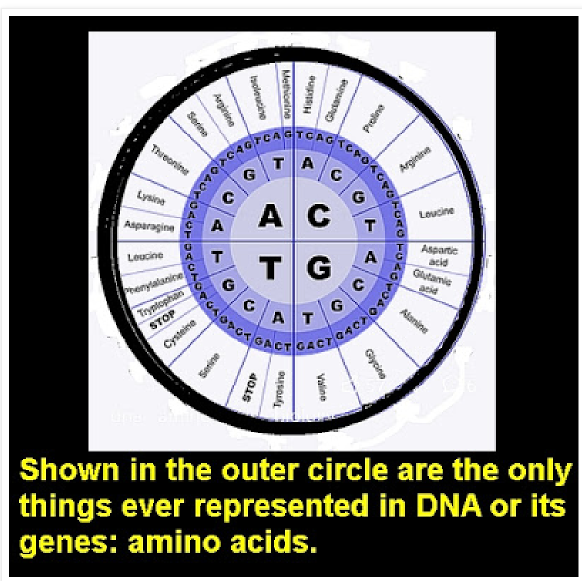
If you ponder the simple fact that blueprints don't build things, you can start to get an idea of how nonsensical and childish is the claim that a human arises because a DNA blueprint is read. Blueprints have no power of construction. When buildings are built with the help of blueprints, it is because intelligent agents read the blueprints to get an idea of what type of construction work to do, and because intelligent agents then follow such instructions. But there is nothing in the human body below the neck with the power to understand and carry out instructions for building a body if they happened to exist in DNA.

Consider what goes on when you read a web page at a complicated site such as www.facebook.com or www.buzzfeed.com. What occurs is a very complicated interaction between two things: (1) a web page that is rather like a blueprint for how the page should look and act, and (2) an extremely complicated piece of software called a web browser, which is rather like a construction crew that reads the web's page blueprint (typically written in

HTML), and then constructs very quickly a well-performing web page. If the web browser did not exist, you would never be able to get a well-performing web page. The construction of a three-dimensional human body would be a feat trillions of times more complicated than the mere display of a two-dimensional web page. Just as it is never enough to have just a web page without a web browser, having some DNA blueprint for building a body would never be enough to build a body. You would also need to have some "body blueprint reader/body construction system" that would be some system almost infinitely more complicated than a web browser, in order for a body to get built from a DNA blueprint if it existed.

We have no evidence that DNA contains any instructions for building cells or anatomy, and we also have no evidence for the existence of any such thing as a "body blueprint reader" in the human body, capable of reading, understanding and executing incredibly complicated instructions for building a human body. When you consider the amount of organization in a human body, you may start to realize the gigantic absurdity of thinking that a human specification can be found in some molecule merely listing low-level chemical information.

Instead of being written using some kind of coding system allowing unlimited expression, DNA is written in the coding system of what is called the genetic code, which is shown below. Such a system allows only the narrowest type of expression: the mere specification of amino acids, low-level chemical building blocks. We see below how this genetic code works. The letters A, T, C and G represent particular types of nucleotide base pair combinations in DNA.



The organization of large organisms is extremely hierarchical. Subatomic particles are organized into atoms, which are organized into amino acids, which are organized into protein molecules, which are organized into protein complexes, which are organized into organelles, which are organized into cells, which are organized into tissues, which are organized into organs, which are organized into organ systems, which are organized into organisms.

Cells are so complex they have been compared to cities. The diagrams you see of cells are enormously misleading, making them seem a thousand times simpler than they are. A cell diagram will show 20 or 30 organelles in a cell, but the actual number is typically more than 1000. A cell diagram will typically depict a cell as having only a few mitochondria, but cells typically have many thousands of mitochondria, as many as a million. A cell diagram will typically depict a cell as having only a few lysosomes, but cells typically have hundreds of lysosomes. A cell diagram will typically depict one or a few stacks of a Golgi appartus, each with only a few cisternae, but a cell will typically have between 10 and 20 stacks, each having as many as 60 cisternae. There are about 200 different cells in the human body.

Internally organisms are enormously dynamic, because of constant motion inside the body, the incredibly complex choreography of metabolism, and also because of a constant activity inside the body involving cellular changes. Just one example of this enormously dynamic acitvity is the fact that protein molecules in the brain are replaced at a rate of about 3% per day. A large organism is like some building that is constantly being rebuilt, with some fraction of it being torn down every day, and some other fraction of it being replaced every day. The analogy comparing a cell to a factory gives us some idea of the gigantically dynamic nature of organisms.

When we consider this enormously dynamic complexity, you may realize that the very idea of a blueprint for building a body is an absurdity, like imagining that the choreography of all of this year's ballets and Broadway shows could be expressed in a blueprint. To have a visual specification for building a human body, you would need something more like a multi-volume set of manuals containing a total of thousands of pages filled with color diagrams and tons of fine print. Even if such a specification existed in the human body, it wouldn't explain morphogenesis: because the specification would be so complex it would require some super-genius to understand it all and build things according to so complicated a specification.

The development of a human body from a one-cell speck-sized zygote can properly be described as a four-dimensional affair. It involves creating a three-dimensional physical structure, but also a structure that is so enormously dynamic that there is very much the time element involved everywhere. Time is often described as the fourth dimension. Specifying the physical progression of a human (with an enormous degree of internal dynamism) from a one-celled zygote requires four dimensions of information, something unavailable in the mere one-dimensional information that is the string-like sequence of DNA. As biologist Steven Rose has stated, "DNA is not a blueprint, and the four dimensions of life (three of space, one of time) cannot be read off from its one-dimensional strand."

So how does a full-sized human body manage to arise from the tiny barely visible simplicity of a speck-sized fertilized egg existing just after human conception? This is a miracle of origination a thousand miles over the heads of today's scientists, who lack any credible explanation for the origin of any adult human body.

Philosophy of Mind Implications of the Limits of DNA and Misstatements About DNA

What I have discussed here demonstrates some things extremely relevant to the philosophy of mind:

(1) Leading biology authorities may teach some childish falsehood, brazenly speaking as if the groundless idea was fact.
(2) This falsehood taught may be not merely some unproven idea, but an idea that is simply disproven and debunked by the known facts.

If this can happen in regard to DNA, it can happen in regard to brains. Just as many biology authorities routinely make claims about DNA contrary to known facts, many biology authorities make claims about brains contrary to known facts, such as the claim that memories are stored by synapse strengthening, an idea violently contrary to what we know about synapses and the unstable dendritic spines they are attached to: their structural instability, the short lifetimes of their proteins (merely weeks or days), and the complete lack of any known thing in a synapse resembling an information storage system or an information storage code. Humans can remember things for 1000 times longer than the average lifetime of the proteins in synapses, and humans can form complex new memories instantly (much faster than the many minutes or hours needed to strengthen synapses).

The fact that DNA fails to explain morphogenesis is of the greatest importance to the philosophy of mind. The failure of scientists to explain the physical origin of any human body suggests some great undiscovered causal reality helping to cause (in a top-down manner) the enormously impressive progression from a speck-sized zygote to the vast organization of the human body. If such a causal reality exists on the physical side, it then seems very reasonable to postulate such a causal reality existing on the mental side, helping to explain the origin of our minds and the preservation of our memories, not credibly explained by brain activity. For further explanation of this hypothesis of a top-down origin of the human mind, read my two posts here.

Postscript: In the Guardian, science writer Phillip Ball says this about the Human Genome Project that ended in 2003:

"But a blizzard of misleading rhetoric surrounded the project, contributing to the widespread and sometimes dangerous misunderstandings about genes that now bedevils the genomic age.So far, there have been few attempts to set the record straight. Even now, the National Human Genome Research Institute calls the HGP an effort to read 'nature's complete genetic blueprint for building a human being' – the 'book of instructions' that 'determine our particular traits'. A genome, says the institute, 'contains all of the information needed to build and maintain that organism'. But this deterministic 'instruction book' image is precisely the fallacy that genomics has overturned, and the information in the genome is demonstrably incomplete. Yet no one associated with genomic research seems bothered about correcting these false claims...Plenty remain happy to propagate the misleading idea that we are 'gene machines' and our DNA is our 'blueprint'.

at November 13, 2022 No comments:

Labels: DNA, genes, morphogenesis

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Head Truth

The huge case for thinking minds do not come from brains

Sunday, November 6, 2022

Science Literature Is Full of Misleading Claims About Brain Waves

Many neuroscientists mislead with colors, and some other neuroscientists mislead us with lines. I give a detailed explanation of how neuroscientists so often mislead us with colors in my post here. I can summarize that post in a single paragraph. What goes on is that neuroscientists do brain imaging studies attempting to show what are called neural correlates of particular mental activities. The neuroscientists are hoping to find evidence that some particular part of the brain will become much more active during some mental activity. With the exception of activity in the occipital part of the brain (which is more active when people are seeing things), no such evidence of much greater activity is found. Typically the brain imaging will only show some brain region being only about 1 part in 200 more active, a half of one percent more active, no more than we would expect to see by chance fluctuations. But what goes on is that such very tiny "half of one percent" variations will be depicted with brain imaging visuals showing the tiny fluctuations appearing in bright red against a black-and-white background. Such visuals deceive us by giving the idea that a large variation has occurred. If the visuals were to be honestly done, they would show variations in color so small you never would be able to notice them. Human brains don't look or act significantly different when you think or imagine or remember, contrary to claims that such things are neural activities.

Now let me explain how so many neuroscientists mislead us with lines and mislead us about lines. This goes on when neuroscientists give us misleading visuals regarding brain waves, and make misleading statements about brain waves. Below is a type of chart that we see very often in the literature of neuroscience, mostly in popular accounts. As I note at the bottom, this type of diagram is misleading, because all five of these types of brains waves show up in all of the different states listed.

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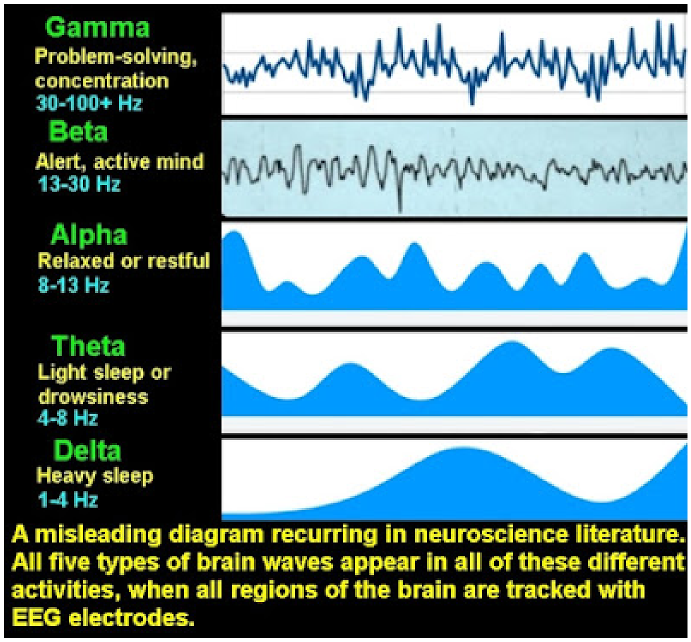

Claims matching the claims above are made in popular literature and also in some very misleading papers written by neuroscientists. This is just another example of neuroscientists making claims in their papers that are not justified by observations, something that occurs massively. An example of such a misleading paper is the paper "Changes of the brain's bioelectrical activity in cognition, consciousness, and some mental disorders." The authors make generalizations about brain waves and cognitive activity that are not justified by any research they cite. The misleading generalizations the authors make in Table 1 of their paper (and the paragraph preceding it) are repeated word-for-word in the wikipedia.org article on Electroencephalography.

Below are some reports from the neuroscience literature, reports that conflict with diagrams like the one above, and conflict with the paper cited above, by showing that all the main types of brain waves occur during the main types of neural activity:

Delta Waves (1-4 Hz)

- "This wave is recorded during very low activities of the brain and deep sleep (link)."
- "Delta waves (DW) are present both during sleep and in wakefulness (link)."
- "Our recordings reveal rhythmic delta during wakefulness at 10% of all recording sites" in 18 humans (link).
- "Recently, however, many studies have reported the presence of prominent delta activity during conscious states, which casts doubt on the hypothesis that high amplitude delta oscillations are an indicator of unconsciousness (link)."
- The diagram here shows many delta waves (1-4 Hz) occurring abundantly in animal brains while animals "waited to see a new image."
- The paper here has a graph showing delta waves (1-4 Hz) occurring abundantly while humans meditated.

- A paper on epileptic seizures says, "Slow waves (≤4 Hz) can be found in seizures with impairment of consciousness and also occur in focal seizures without impairment of consciousness but with inhibited access to memory functions."
- The paper "Brain Activation and Cognitive Load during EEG Measured Creativity Tasks Accompanied by Relaxation Music" has circular "power spectral analysis" charts for six subjects, showing mostly delta and theta waves (about 5 Hz) for subjects while they were doing three things: resting, doing creative work, and speaking.
- The paper "IDENTIFICATION OF DOMINANT WAVE DURING THE RECITATION OF AL-MULK VERSE WITH (WITHOUT) UNDERSTANDING USING EEG SIGNAL" reports "During Al-Quran recitation (without understanding), the highest amplitude of the power spectrum distribution was observed in Delta at the Frontal area (F1, F2, F4, F7 and F8), and Beta2 and Gamma on EEG, predominantly in the T3, T4 and T5 area." This is an example of what occurs very frequently: which brain wave is dominant will vary depending on which brain region is read from.

Theta Waves (4-8 Hz)

- "In anxious individuals for example, research suggests that there is a significantly higher degree of frontal-midline theta activity compared to non-anxious individuals, and that could be associated with more reactive control modes of behavior in the moment rather than proactive behaviors such as planning and preparation (link)."
- "This rhythm is recorded during low brain activities, sleep, or drowsiness (link)."
- "Theta waves generate the theta rhythm, a neural oscillation in the brain that underlies various aspects of cognition and behavior, including learning, memory, and spatial navigation in many animals (link)."
- The diagram here shows many theta waves (4-8 Hz) occurring in animal brains while animals "waited to see a new image."
- The paper here has a graph showing theta waves (4-8 Hz) occurring abundantly while humans meditated.
- A scientific paper states that "REM sleep is characterized by frequencies in the theta (4–8 Hz), beta (16–32 Hz), and gamma (>32 Hz) ranges."
- The paper here has a graph (Figure 8) showing theta waves (4-8 Hz) occurring abundantly in people playing a throwing game.
- The paper "Brain Activation and Cognitive Load during EEG Measured Creativity Tasks Accompanied by Relaxation Music" has circular "power spectral analysis" charts for six subjects, showing mostly delta and theta waves (about 5 Hz) for subjects while they were doing three things: resting, doing creative work, and speaking.
- The paper here found quite a bit of alpha, theta and gamma waves during a memorization test.

- Exhibit A Suggesting Scientists Don't Understand How a Brain Could Store a Memory
- The Dubious Dogma That Brains Make Decisions
- Long Article Tries to Show Neural Memory Storage, but Gives No Real Evidence for It
- How Evidence for ESP Undermines the “Minds Come From Brains” Dogma
- Gender Differences in Brains Help Discredit Prevailing Dogmas About Brains
- Study Finds Equal Brain Connectivity in All Mammals
- Some Reasons the Main Theory of Neural Memory Storage Is Unbelievable
- Scientists Can't Persuasively Explain How a Brain Could Instantly Retrieve a Memory
- The Lack of Evidence for Memory-Storage Engram Cells
- Candid Confessions of the Cognitive Experts
- Global Workspace Theory Sure Isn't an Explanation for Consciousness
- When Animals Cast Doubt on Dogmas About Brains
- Memories Can Form Many Times Faster Than the Speed of Synapse Strengthening
- The Guy with the Smallest Brain Had the Highest IQ
- He Had Half a Brain and Above Normal Intelligence
- The Truth About Neurons and Synapses
- A Diagram of Explanatory Dysfunction in Academia
- The Brain Shows No Sign of Working Harder During Thinking or Recall
- More Evidence of High Mental Function Despite Large Brain Damage
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- Reasons for Doubting Thought Comes from the Frontal Lobes or Prefrontal Cortex
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- Other Evidence of Human Paranormal Abilities

Alpha Waves (8-13 Hz)

- The paper here has a graph showing alpha waves occurring abundantly while humans meditated.
- The diagram here shows many alpha waves (8-13 Hz) occurring abundantly in animal brains while animals "waited to see a new image."
- The paper here has a graph (Figure 8) showing alpha waves (8-13 Hz) occurring abundantly in people playing a throwing game.
- In Figure 1 of the paper here, we are shown multitaper EEG spectrograms that are called representative of sleep, and those diagrams seem to depict theta, alpha and beta waves occurring almost as frequently as delta waves.
- The paper here refers to alpha waves occurring during anesthesia, when a patient is in deep unconsciousness. We read, "All four spectrograms for these data show the well-known alpha-beta oscillations (8–17 Hz) and slow-delta oscillations (0.1–4 Hz) that are characteristic of general anesthesia maintained by sevoflurane."
- The paper here found quite a bit of alpha, theta and gamma waves during a memorization test.
- While the page here claims that alpha waves "disappear during sleep," the page here states that "stage 1 sleep is associated with both alpha and theta waves," and shows an EEG of alpha waves recorded during sleep. The page here states that alpha waves of between 8 to 14 Hz occur in "bursts of activity" in stage 2 sleep (light sleep).
- A paper studying brain waves during hypnosis in 8 subjects found little change in brain waves, with alpha waves being the main type of wave before, during and after hypnosis. Conversely, another paper tells us "a number of studies have not found an increase in alpha activity with hypnosis (Kihlstrom, 2013; Ray, 1997; Sabourin, Cutcomb, Crawford, & Pribram, 1990)," and it also tells us "findings linking hypnosis to theta oscillations, however, are more common."

Beta Waves (13-30 Hz)

- The first graph below show gamma waves while animals "waited to see a new image."
- The paper here has a graph showing beta waves occurring abundantly while humans meditated.
- An article in an encyclopedia of neuroscience states, "Beta and gamma waves (20–80 Hz) occur spontaneously during REM sleep and waking and are evoked by intense attention, conditioned responses, tasks requiring fine movements, or sensory stimuli."
- In Figure 1 of the paper here, we are shown multitaper EEG spectrograms that are called representative of sleep, and those diagrams seem to depict theta, alpha and beta waves occurring almost as frequently as delta waves.
- The paper here has a graph showing beta waves occurring in significant amounts during anesthesia.

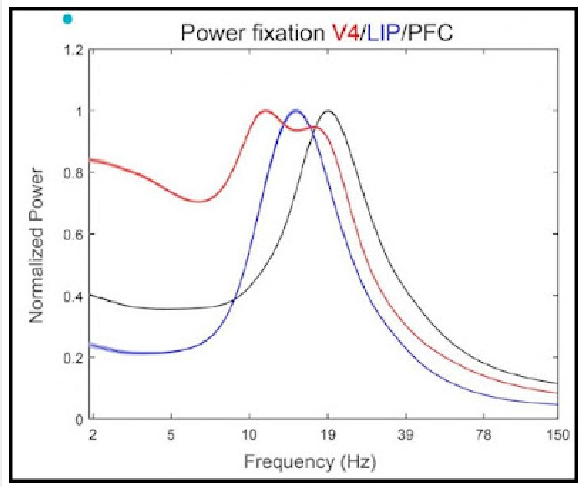
- The paper here has a graph (Figure 8) showing beta waves (13-30 Hz) occurring abundantly in people playing a throwing game.

Gamma Waves (30-100 Hz)

- The first graph below show gamma waves while animals "waited to see a new image."
- The paper here has a graph showing gamma waves occurring abundantly while humans meditated. Despite some claims of gamma wave activity being associated with concentration, a study of brain-injured veterans found they have much higher levels of gamma waves in a certain brain region.
- A paper found that "gamma oscillations in low (30–50 Hz) and high (60–120 Hz) frequency bands recurrently emerged in all investigated regions" in the brains of 20 humans during "slow wave sleep."
- A paper on sleeping monkeys says, "Gamma oscillations around 50 Hz or higher were most prominently observed during REM sleep."
- An article in an encyclopedia of neuroscience states, "Beta and gamma waves (20–80 Hz) occur spontaneously during REM sleep and waking and are evoked by intense attention, conditioned responses, tasks requiring fine movements, or sensory stimuli."
- A scientific paper states that "REM sleep is characterized by frequencies in the theta (4–8 Hz), beta (16–32 Hz), and gamma (>32 Hz) ranges. "
- Another paper found gamma wave activity (in the range of 30-40 Hz) in hypnotized subjects.
- A paper states that "gamma oscillations (30-50 Hz) recorded in the local field potentials (LFP) of the hippocampus are a marker of temporal lobe seizure propagation," and that "78.2% of seizures involving both the hippocampus and amygdala showed hippocampal gamma oscillations," conflicting with claims that such gamma waves (gamma oscillations) are characteristic of problem solving or concentration.
- The paper here found quite a bit of alpha, theta and gamma waves during a memorization test.
- The source here states that "some researchers contest the validity or meaningfulness of gamma wave activity detected by scalp EEG, because the frequency band of gamma waves overlaps with the electromyographic frequency band," so "gamma signal recordings could be contaminated by muscle activity."

Graphs Plotting Multiple Brain Wave Types During a Single Activity

One way to get a clearer idea about such matters is to look for papers that plot multiple brain wave types during a single type of mental activity. You can find some papers of this type by doing a Google search for "brain wave power frequency." For example, the link here takes to a press release for a study with a line graph that plots all types of brain waves seen while animals "waited to see a new image." We see the diagram below:



The graph shows brain waves from three different parts of the brain. The graph shows plenty of all five of the main types of brain waves: delta waves, theta waves, alpha waves, beta waves and gamma waves. The graph does not match the depiction in the typical brain wave chart, suggesting delta waves only occur during sleep.

The paper here shows a similar graph of brain waves arising when humans meditated. Delta waves, theta waves, alpha waves, beta waves and gamma waves all occur in pretty much equal abundance. The paper here shows a similar graph arising with three subjects in a resting state (awake but eyes closed) and one subject looking at a blue "O" in front of him. All had delta, theta, alpha and beta waves in roughly equal amounts.

The paper here shows (1) a circular graph of brain waves arising when six humans were in a resting awake state; (2) a circular graph of brain waves arising when six humans were doing creative activity (3) a circular graph of brain waves arising when six humans were speaking. There is little different in the three graphs. They all show theta waves of about 5 Hz as being by far the most common brain wave during all of these mental states, with beta waves and gamma waves occurring much less frequently.

There is a type of graph called a multitaper EEG spectrogram. Someone unfamiliar with it will have to take a few minutes studying how the graph works before he can understand it. The graph can show up to 8 hours of brain activity. Each column of pixels shows the activity for a particular short time unit such as a minute. The higher rows on the graph represent the higher-frequency brain waves. A red color represents a high intensity; a yellow or green color represents a medium intensity; and a blue color represents a lower intensity.

We are sometimes shown versions of this graph which will suggest that lower-frequency brain waves are much more common during sleep. However, in Figure 1 of the paper here, we are shown multitaper EEG spectrograms that are called representative of sleep, and those diagrams seem to depict theta, alpha and beta waves occurring almost as frequently as delta waves.

In a Dream Catcher study described here and the 2020 scientific paper here, EEG recordings were made of subjects while they were sleeping. The subjects were awakened at random times, and asked to tell whether or not they were dreaming. Then some scientists ("blind" to which EEG readings were from the dreamers) were asked to guess whether particular subjects were dreaming. The result was a null result. There was no evidence that by studying EEG recordings you can tell whether a person is dreaming.

Scientists apparently delayed the release of these results for years. A 2015 paper describes results just like those of the Dream Catcher study, but results that had apparently not yet been published:

"When data from serial awakenings of 9 subjects had been collected, these data were divided. Introspective reports and electroencephalographic recordings were analysed by different judges who were ignorant of which EEG sequences had led to dream reports and which ones had not. An external EEG research group used a number of statistical methods to identify the signature of the recordings that were followed by dream reports. But the accuracy of their predictions turned out to be no better than chance. A doctoral researcher presenting these findings at a conference explained that there were 4 different explanations for this failure: 'Subjective experience is a) not in the brain, b) is in the brain, but not in the EEG, c) is in the EEG, but not in our data, or d) is in the data, but needs more complex and novel methods of analysis.'"

The paper then quotes someone from 2008 saying this:

"We still haven't found any objective sign indicating the presence or absence of consciousness in the dreaming brain. Maybe that's something that Descartes would have predicted: that you cannot objectively capture consciousness because it is this immaterial, non-spatial, and imperceptible thing ... We haven't been able to disprove the Cartesian position ... The dream catcher experiment is a test of the whole emergent materialist position ... We will continue our analysis, but if we can't find anything then we have a real problem where to go."

Brain Waves During Hypnosis

A paper studying brain waves during hypnosis in 8 subjects found little change in brain waves, with alpha waves being the main type of wave before, during and after hypnosis. A study with a much larger study group size (32 subjects) found little change in brain wave activity during hypnosis. The paper ("An Investigation of Changes in Brain
Wave Energy during Hypnosis with Respect to Normal EEG") states this:

"We have found significant changes in the delta and beta band relative energy in channel C3. But the results of the statistical analysis show that the changes of the energy in the other frequency bands and also in the other channels are not significant."

Hypnosis involves dramatic changes in human consciousness. The topic of changes in human pain perception, mental abilities and suggestibility during hypnosis is itself a huge topic with a very large literature. The fact that something (hypnosis) involving so large a change in mental states seems to involve so little a change in brain waves is one that helps to undermine claims that minds come from brains.

Were True

- "Brains Make Minds" Models All Flunk a Large Brain Scan Study
- The Philosophy of Teleospiritism
- The Biggest Blunders of Theories Such as Integrated Information Theory
- Study Finds No Robust Link Between Brain Structure and Personality
- The Two Huge Mistakes Involved in Typical Talk of a "Hard Problem of Consciousness"
- Neuroscientists Keep Wrongly Assuming the Source of Something Must Be Near Its Observed Manifestations
- The Vague Unfounded Boasts of Biology Sound Like the Vague Unfounded Boasts of Astrophysics
- 8 Reasons for Doubting Claims of the Heritability of Intelligence
- Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"
- Exhibit A Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- Exhibit B Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- More Indications Scientists Don't Understand How a Brain Could Think or Remember
- Studies New and Old Fail to Show a Big Link Between Brain States and Minds

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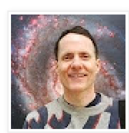

Mark Mahin

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March 2023 (2)

Trying to Predict Personality From Brain Waves

An interesting paper with a sample size much larger than in most neuroscience papers is the paper "Personality cannot be predicted from the power of resting state EEG." We read this:

"EEG was recorded from a large sample of subjects (n = 289) who had answered questionnaires measuring personality trait scores of the five dimensions as well as the 10 subordinate aspects of the Big Five. Machine learning algorithms were used to build a classifier to predict each personality trait from power spectra of the resting state EEG data. The results indicate that the five dimensions as well as their subordinate aspects could not be predicted from the resting state EEG data."

Conclusion

Neuroscience literature very often makes untrue simplistic generalizations about brain waves, statements suggesting incorrectly that particular types of brain waves only occur during particular types of activities. In general, with a few scattered exceptions, there is no close correspondence between brain waves and particular types of mental activities and mental states. Scientific studies and popular articles on this topic make extensive use of cherry-picking, in which signal dominance will be reported with some activity, based on readings from only one part of the brain. Typically a reading of brain waves from all parts of the brain will show a mix of most types of brain waves occurring during most types of mental activities. In general, brain waves are not signatures of some particular type of mental activity.

Frequent claims that brain waves play a role in memory or learning are without foundation, and the evidence is consistent with such waves being merely an epiphenomenon of neural activity (like the scent arising from cooking soup). Brain waves show no sign of the signal modulation that characterizes information signals (like the signal modulation we see in man-made radio waves).

at November 06, 2022 3 comments:

Labels: brain waves

Sunday, October 30, 2022

Misleading Claims in Attempts to Naturally Explain Near-Death Experiences and Out-of-Body Experiences

Near-Death Experiences and Out-of-Body Experiences: Phenomena Defying "Brains Make Minds" Claims

The dogma that our minds are produced by our brains is a dogma that makes some very definite predictions. One prediction of such a dogma is that human mental activity should completely stop both after someone dies and after someone's brain shuts down. During cardiac arrest, a person will “flatline.” Not only will his heart stop beating, but his brain waves will also stop within 2 to 20 seconds after his heart stops. This means the brain has stopped working. Unless the person is revived through medical resuscitation efforts, he will die.

But contrary to the predictions of the dogma that minds are produced by brains, it is often found that mental activity continues after both the heart and the brain have shut down. Such events are called near-death experiences.

Near-death experiences first came to widespread public consideration in the 1970's with the publication of Raymond Moody's 1975 book *Life After Life*. Patching together elements from different accounts, Moody described an archetypal typical near-death experience, while noting that most accounts include only some elements in the described archetype. The archetype NDE included elements such as a sensation of floating out of the body, feelings of peace and joy, a life-review that occurs very quickly or in some altered type of time, a passage through a tunnel, an encounter with a being of light, and seeing deceased relatives. Accounts of near-death experiences and out-of-body experiences actually appeared before Moody's book, as you can read about here. The pages here and here describe out-of-body experiences of the nineteenth century. The page here lists a nineteenth century near-death experience involving the "life review" so often reported in near-death experiences. The page here (from a 1972 book) mentions four cases of someone being told that he or she must "go back" during an out-of-body experience, a common element in near-death experiences.

A study on near-death experiences was published in the British medical journal *The Lancet* in 2001. The study interviewed 344 patients who had a close encounter with death, generally through cardiac arrest. 62 of those reported some kind of near-death experience. 15 reported an out-of-body experience, 19 reported moving through a tunnel, 18 reported observation of a celestial landscape, 20 reported meeting with deceased persons, and 35 reported positive emotions.

The AWARE study was published in 2014 in the journal Resuscitation. It was entitled, "AWARE—AWAreness during REsuscitation—A prospective study." The URL can be found here.

The AWARE study name is an acronym for *awa*reness during *re*suscitation – the type of resuscitation that takes place when a person has a heart attack (cardiac arrest) and almost dies. The study collected data at 15 different hospitals, and was carried on over the course of four years. The study attempted to gather accounts of people's recollections in hospitals after they had very close encounters with death, typically during a heart attack or cardiac arrest. Over 2000 cardiac arrest cases were studied, and there were only 330 who survived to leave the hospital. Of those 330, only 101 met eligibility requirements, agreed to be interviewed, and also agreed to "stage 2" interviews.

So the study ended up with a group of only 101 persons who had experienced a close encounter with death, generally because of a cardiac arrest. Of this pool of 101 persons, 22% answered "Yes" to the question, "Did you have a feeling of peace or pleasantness?" 13% answered "Yes" to the question, "Did you feel separated from your body?" 13% answered "Yes" to the question, "Were your senses more vivid than usual?" 8% answered "Yes" to the question, "Did you seem to encounter a mystical being or presence, or hear an unidentifiable voice?" 7% answered "Yes" to the question, "Did you seem to enter some other, unearthly world?" Only 3% answered "Yes" to the question, "Did you see deceased or religious spirits?"

These results are corroboration of published accounts of what typically

Labels

happens in a near-death experience, although the numbers are smaller than those reported in the Lancet study. As discussed here, the AWARE study does quote one respondent who gives an account very much like what has been published in previous books on near-death experiences:

"I have comeback from the other side of life. ..God sent (me) back,it was not (my) time — (I) had many things to do. ..(I traveled) through a tunnel toward a very strong light, which didn't dazzle or hurt (my) eyes. ..there were other people in the tunnel whom (I) did not recognize. When (I) emerged (I) described a very beautiful crystal city. .. there was a river that ran through the middle of the city (with) the most crystal clear waters. There were many people, without faces, who were washing in the waters. ..the people were very beautiful. .. there was the most beautiful singing. ..(and I was) moved to tears. (My) next recollection was looking up at a doctor doing chest compressions."

While the AWARE study did not find a very large number of cases of near-death experiences, the study did seem to "hit the jackpot" in regard to one case of a 57-year-old patient who said that he floated out of his body while being revived from his cardiac arrest. The man said that a woman appeared in a high corner of the room, beckoning him to come up to her. He said that despite thinking that was impossible, he found himself up in the high corner of the room, looking down on the medical team trying to revive him. The man described specific details of the revival efforts, including the presence of a bald fat man with a blue hat, a nurse saying, "Dial 444 cardiac arrest," his blood pressure being taken, a nurse pumping on his chest, a doctor sticking something down his throat, and blood gases and blood sugar levels being taken.

Here is what the AWARE scientific paper said in regard to the accuracy of these recollections:

"He accurately described people, sounds, and activities from his resuscitation...His medical records corroborated his accounts and specifically supported his descriptions and the use of an automated external defibrillator (AED). Based on current AED algorithms, this likely corresponded with up to 3 minutes of conscious awareness during CA [cardiac arrest] and CPR."

So here is a man who had a heart attack, and should have been unconscious during the medical efforts to revive him. Instead he accurately describes the details of what happened. Moreover, he claims that he observed these details while in a position above his body, in the high corner of the medical room. What we have here is what seems like a good-as-gold vintage "out of the body experience," one with details that have been verified. This is an example of what is called a veridical near-death experience – one with observations that were subsequently verified.

In terms of its credibility and evidence value, the case may rival the famous Pam Reynolds case. At the time of her brain operation, the late Pam Reynolds was a 35-year old who had a large brain aneurysm. She underwent a very complicated operation that involved pumping out her blood and chilling her body temperature to only 60 degrees. Some twenty medical personnel worked on the complex operation.

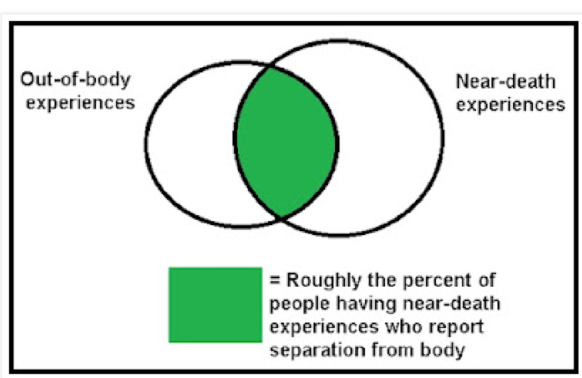
- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

After the successful operation was over, Reynolds reported having a near-death experience during the operation. She reported floating out of her body, and witnessing her operation. She accurately reported details of some medical equipment that was used to cut her skull open, describing it as a “saw thing...like an electric toothbrush,” with “interchangeable blades” that were stored in “what looked like a socket wrench case.” She reported someone complaining that her veins and arteries were too small. These details were later verified. This was despite the fact that during the operation Reynolds eyes were covered throughout the operation, and her ears were plugged with earplugs delivering noise of 40 decibels and 90 decibels (not to mention that her body was chilled to a level at which consciousness should have been impossible).

Reynolds said that she then encountered a tunnel vortex, saw an incredibly bright light, heard her deceased grandmother calling her, and encountered several of her deceased relatives. Reynolds says she was told by her uncle to go back through the tunnel, and to return to her body. These details were originally reported in the 1998 book *Light and Death* by Michael Sabom MD. That book includes diagrams of the medical equipment used to cut open Reynold's skull. They match her descriptions very well.

Many people have heard of one or two of these veridical near-death experiences, perhaps the Pam Reynolds case or the often-told story about “Maria's shoe.” But judging from the book *The Self Does Not Die: Verified Paranormal Phenomena from Near-Death Experiences,* these veridical near-death experiences may not be so rare. That book describes many cases similar to that of the Pam Reynolds case. My post here gives a summary of the main cases that book discusses. That post discusses many cases in which people correctly observed things during near-death experiences that should have been quite impossible for them to have observed, given their location and medical condition.

A phenomenon that overlaps with near-death experiences is out-of-body experiences, in which a person reports either leaving his body and going far away from it, or viewing his body while not in his body. The diagram below roughly shows the relation between near-death experiences and out-of-body experiences. A person can have an out-of-body experience without being close to death. The fraction depicted below (about 25%) roughly corresponds to data from the AWARE study, in which there were 55 subjects reporting awareness during a cardiac-related near-death experience, and 13 of them answered "Yes" to the question "Did you feel separated from your body?"



- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

The diagram above merely shows a rough estimate of the percentage of people having near-death experiences who report out-of-body experiences. The question of what such a percentage may be is clouded by the fact that those having near-death experiences may report being in a kind of different body from their earthly body. In the paper *The Phenomenology of Near-Death Experiences* by Bruce Greyson and Ian Stevenson, which examined in depth 78 near-death experiences, we have this very interesting quote:

"The impression of having some sort of nonphysical body separate from the physical body was reported by 58% of our respondents (77% of those reporting out-of-the-body experiences)."

Pages 34-38 of the book *Out of Body Experiences; A Handbook* describes how out-of-body experiences have been reported for centuries in cultures all over the world. We read, "In 1978 a cross-cultural study by Shiels revealed that only three of 44 societies did not hold a belief in OBEs." There is a large body of literature involving people who claimed to have had out-of-body experiences. Many accounts can be found in the various editions of the Journal and Proceedings of the British Society for Psychical Research and the American Society for Psychical Research (including the account described here). A long account of out-of-body experiences was given in the 1929 book *The Projection of the Astral Body* by Sylvan J. Muldoon, which you can read here. In the 1960's and 1970's the scholar Robert Crookall PhD collected many accounts of out-of-body experiences. His works on the topic include these:

- *The Supreme Adventure* (1961), which you can read here.
- *The Techniques of Astral Projection* (1964), which you can read here.
- *More Astral Projections* (1964), which you can read here.
- *Out-of-the-Body Experiences* (1970), which you can read here.

The *More Astral Projections* book gives about 160 cases of out-of-body experiences. In the accounts collected by Crookall, a large fraction or most of those reporting out-of-body experiences reported being in a kind of second body (what can be called a soul-body), with such a thing often mysteriously connected to the physical body by a kind of kind of link or cord, one often described as elastic.

A very important point to remember is that in general neuroscientists are almost never serious scholars of paranormal phenomena. So if you ever hear a neuroscientist make generalizations about near-death experiences or out-of-body experiences, with very high likelihood you will be hearing someone talking about a topic he has not seriously studied.

Misleading Claims in Attempts to Neurally Explain Near-Death Experiences

There are two ways in which materialists attempt to deal with reports of paranormal phenomena:
(1) They may pretty much ignore the phenomena, say little or nothing about it, and hope that the public pays no attention to it.
(2) They may attempt to offer some evidence that they think may help to explain away the phenomena.

Materialists have figured out that method (1) above does not work for near-death experiences, because near-death experiences are too well known. So they have made some attempt along the lines of method (2) above. There is a tiny mini-body or micro-body of papers and articles attempting to offer evidence for a neural explanation or some kind of neural account for near-death experiences. A typical feature of such papers and articles in dishonesty and distortion.

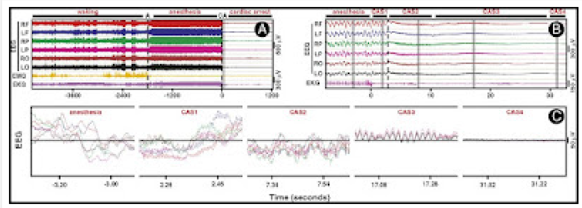
Let's look at some of the papers most commonly cited in articles attempting to make it sound like there is some neural account to be told clarifying near-death experiences. Most of these articles cite a 2013 paper with the very misleading title "Surge of neurophysiological coherence and connectivity in the dying brain." The paper makes a misleading use of the technical EEG terms "coherence" and "connectivity."

An EEG is a device for measuring brain waves, one requiring the attachment of multiple electrodes on the head. In the technical jargon of EEG analysts, "coherence" means some length of time in which you are getting the same type of brain waves from two different regions of the brain. The paper here states, "Coherence is one mathematical method that can be used to determine if two or more sensors, or brain regions, have similar neuronal oscillatory activity with each other." There are different ways in which the term "connectivity" is used by neuroscientists. One of these ways is "structural connectivity" meaning the number of connections between brain cells. But, according to that paper, there's another way in which "connectivity" is used: "*Functional connectivity* identifies activity brain regions that have similar frequency, phase and/or amplitude of correlated activity."

So given such speech customs, a neuroscientist analyzing the ups and downs of brain waves can claim "coherence" or "connectivity" as long as he sees any type of similarity between different regions of a brain giving the same kind of EEG readings. This is what the authors of the 2013 paper did. What they observed was simply the brain waves of rats quickly dying off to become a flat line. But because the brain waves from each regions quickly trailed off and died off in the same way, the authors have called this behavior "coherence" and "connectivity."

While this may not be a very clear case of an outright lie (given the speech habits of EEG analysts), the title of the paper is misleading, because it creates a very false impression in the minds of 95% of the people who read it. 95% of the people reading a title of "Surge of neurophysiological coherence and connectivity in the dying brain" will think that some indication was found of increased cognitive activity in dying brains. The paper found no such thing. The "coherence" and "connectivity" supposedly found was not a surge but merely a blip, and it did not involve anything like some surge of mental activity. Nothing whatsoever was found that can help to neurally explain near-death experiences. In fact, there is every reason to think that the at time when this little blip of claimed "coherence" and "connectivity" occurred, all of the rats were unconscious.

Figure 1 of the paper is shown below. We see EEG brain wave signals from rats who were injected with a chemical causing the heart to stop.



Nothing impressive is seen. It's just what you would expect: brain signals trailing off and dying out very quickly after the heart stops. This data offers no justification for a title of "Surge of neurophysiological coherence and connectivity in the dying brain." An honest title of the paper would have been: "Brain waves very quickly trail off and die out after hearts stop in rats."

After this paper with a misleading title was published, we had innumerable misleading citations of it in the articles of materialist or mainstream writers, claiming or insinuating that the paper showed or suggested something it did not either show or suggest. An example was a National Geographic article with the misleading title "In Dying Brains, Signs of Heightened Consciousness." The 2013 "Surge of neurophysiological coherence and connectivity in the dying brain" paper had not anything whatsoever to show "signs of heightened consciousness" in the dying rats it studied. Similarly, a 2017 Big Think article linked to the 2013 paper and claimed, "One 2013 study, which examined electrical signals inside the heads of rats, found that the rodents entered a hyper-alert state just before death." This claim is totally false, and the paper suggested nothing of the sort.

These days this kind of thing goes on constantly in the world of science journalism and materialist apologetics:
(1) Scientists often give their papers titles that are not justified by anything they observed (partially to maximize their chance of getting the paper citations that scientists crave).
(2) Journalists adding an additional layer of hype, distortion and misrepresentation, by claiming the papers showed or suggested something that the papers did not provide any good evidence for. It's a "give 'em an inch, and they'll take a mile" kind of situation. For example, if a scientific paper mildly suggests that just maybe some odd observations could have been produced by extraterrestrials, the paper will be mentioned in dozens of new stories breathlessly claiming that scientists have shown extraterrestrials exist.

The 2013 paper was discredited by a 2017 paper "Electroencephalographic Recordings During Withdrawal of Life-Sustaining Therapy Until 30 Minutes After Declaration of Death." That 2017 paper studied the brain waves of four humans who died after their hearts stopped. Referring to the 2013 paper, the 2017 paper stated, "We also did not observe any well-defined EEG states following the early cardiac arrest period as previously reported in rats." But in the articles of those trying to portray some neural explanation for near-death experiences, we read no mention of this 2017 paper. Such articles keep citing the 2013 study involving rats, but won't tell us about a more relevant 2017 study involving humans.

An outrageous 2022 example of fake news was a recent story in the British new source The Independent, a story with the phony headline, "Brain scan reveals patient’s ‘last thoughts’ just before they died in landmark study." Below are some of the reasons the headline and the story are as phony as a three-dollar bill:

- The scientific study ("Enhanced Interplay of Neuronal Coherence and Coupling in the Dying Human Brain") made no claim to have revealed the thoughts of the dying 87-year-old patient, nor did it even make any guess about such a thing.
- No one is quoted in the article referring to last thoughts.
- The headline uses the phrase "just before they died," suggesting there were multiple patients involved in the new study; but there was only one patient.
- The patient did not actually have his brain scanned as he died. Brain scans are done with MRI machines, and the patient was not being scanned in an MRI machine or any similar machine when he died. Instead, there was a merely a reading of electrical activity by means of EEG electrodes.
- There was nothing "landmark" about the study, as there have been electrode readings of the brain activity of numerous previous patients as they died. The subtitle of the story makes the untrue claim that there were "first-of-a-kind brain scans," when nothing "first-of-a-kind" was done, and no brain scan was done.
- There are very strong reasons for assuming that the patient in question was unconscious in the moments before death, and that he therefore was not thinking about anything just before dying.

A Frontiers press release is guilty of getting the ball rolling on this fake news story, by suggesting the utterly groundless idea that the EEG readings from a seizure-wracked dying patient in a coma did something to suggest the patient was recalling events in his life. Here is a quote from the press release:

" 'We measured 900 seconds of brain activity around the time of death and set a specific focus to investigate what happened in the 30 seconds before and after the heart stopped beating,' said Dr Ajmal Zemmar, a neurosurgeon at the University of Louisville, US, who organised the study. 'Just before and after the heart stopped working, we saw changes in a specific band of neural oscillations, so-called gamma oscillations, but also in others such as delta, theta, alpha and beta oscillations.' Brain oscillations (more commonly known as 'brain waves') are patterns of rhythmic brain activity normally present in living human brains. The different types of oscillations, including gamma, are involved in high-cognitive functions, such as concentrating, dreaming, meditation, memory retrieval, information processing, and conscious perception, just like those associated with memory flashbacks. 'Through generating oscillations involved in memory retrieval, the brain may be playing a last recall of important life events just before we die, similar to the ones reported in near-death experiences,' Zemmar speculated. "

Notice the nonsense reasoning here. It's basically this:

(1) People have different types of brain waves, which occur when they do various things like thinking, recalling, meditating (which does not involve recall), and perceiving.

(2) Some brain waves were measured in a person who died.

(3) So maybe he was recalling important life events.

This is nonsensical logic. The study has not provided the slightest reason for thinking that the dying person was remembering past events in his life. To the contrary, we can think of the strongest reason why a person would not be recalling important life events after having a sudden heart attack. The sudden heart attack would produce great pain and great distress, and under such conditions if you were conscious you would be no more likely to be recalling past life events than you would be if someone suddenly stabbed you in the chest. In fact, sudden fatal heart attacks instantly produce unconsciousness which should prevent anyone from engaging in thinking about past events.

The scientific paper describes the patient's condition before death, and we learn of a state so dire that any speculation about the patient reliving past memories seems supremely absurd. We are told the patient was a 87-year-old who had suffered a fall, and who was in a coma (rating 10 on the Glascow Coma Scale, meaning a moderate coma). Here is how the paper describes the patient's death.

"An electroencephalography (EEG) was obtained, which showed non-convulsive status epilepticus in the left hemisphere. There were at least 12 identified electrographic seizures, after which a burst suppression pattern spontaneously developed over the left hemisphere (Figure 2A). Shortly thereafter, electrographic activity over both hemispheres demonstrated a burst suppression pattern, which was followed by development of ventricular tachycardia with apneustic respirations and clinical cardiorespiratory arrest. After discussion with the patient's family and in consideration of the 'Do-Not-Resiscitate (DNR)' status of the patient, no further treatment was administered and the patient passed away."

Given such a patient state, it is obvious folly to be speculating that such a patient was reliving past memories just before death. Status epilepticus is a life-threatening seizure of particularly long length. Apneustic respirations are a kind of gasping suggesting death is very near. Twelve seizures would have produced a "witch's brew" of brain signals showing up on EEG readings, and from such a thunderstorm of brain signals nothing reliable can be inferred about what a patient was thinking or recalling. Since the patient was in a coma and plagued by a dozen seizures that disrupt mental processes such as recollection if it is occurring, it makes no sense at all to speculate that the patient was thinking about or recollecting anything.

Giving us a headline as phony as the headline quoted above from the Independent, the Daily Mail gives us this fake news headline about this patient: "Our lives really DO flash before us: Scientists record the brain activity of an 87-year-old man at the moment he died, revealing a rapid 'memory retrieval' process." This headline is as phony as a three-dollar bill. Zero evidence has been provided in the scientific paper of any memory retrieval around the time of death, and the patient's condition gives the strongest reason for disbelieving that any such thing was occurring. A similar fake news headline occurs on www.bbc.com, showing that once an expert lights a fake news match, the fake news fire will spread even to sources the average person regards as having high journalistic standards. Dozens of news site repeated the groundless claim that neuroscientists had used medical technology to show that someone's life flashes before their eyes when they are dying.

There is an abundance of reliable evidence that people have extraordinary near-death experiences after their hearts have stopped. Such experiences often include what are called life-review experiences, in which a person may recall important moments from his life. Neuroscience has done nothing to explain such near-death experiences, nor has neuroscience provided any evidence that such life reviews occur. We know they occur solely because of eyewitness testimony.

The paper here casts cold water on the "Enhanced Interplay of Neuronal Coherence and Coupling in the Dying Human Brain" paper discussed above, implying that whatever it observed may have been an artifact of muscle movement, which produces confounding signals in EEG readings.

Misleading Claims in Attempts to Neurally Explain Out-of-Body Experiences

Misstatements about out-of-body experiences are common in papers and articles written by those trying to naturally explain such experiences. An example is to be found in the paper "The Out-of-Body Experience: Disturbed Self-Processing at the Temporo-Parietal Junction." The authors make this very erroneous claim: "OBEs have been observed predominantly in patients with epilepsy and migraine." No, out-of-body experiences do not mostly occur in people who have epilepsy or migraines.

The attempt of the authors to justify such a claim suggests a great shortfall of scholarship on this topic. After making the extremely untrue statement above, they try to justify it by claiming this: "Thus, Lippman (1953) reported two migraine patients with OBEs, and Green (1968) reported that 11% of the OBE subjects that participated in her survey suffered from migraine headaches." Any person who seriously studied out-of-body experiences would have found out that surveys report them occurring in significant fractions of the human population, and would realize the utter folly of trying to justify a claim that out-of-body experiences are caused mainly by migraines or epilepsy by citing a mere two patients having migraines and out-of-body experiences. And anyone writing carefully would have realized the folly of trying to justify a claim that *most* out-of-body experiences are produced by migraines or epilepsy by citing some person claiming that *merely 11%* of some group of people having out-of-body experiences had migraines.

Trying to claim that out-of-body experiences are largely caused by migraine headaches makes no sense. In a book about near-death experiences and out-of-body experiences (OBEs), Dr. Peter Fenwick states, "A prominent feature of OBEs is that pain is entirely absent." But since migraine headaches are episodes of intense pain, it makes no sense to claim they are the cause of painless out-of-body experiences. The source here discusses a variety of surveys taken to try to determine how common out-of-body experiences are. It gives numbers which suggest that out-of-body experiences occur to significant fractions of the human population, something like between 10% and 20%.

When materialists attempt to offer natural explanations for out-of-body experiences, what very often goes on is that experiences that are not out-of-body experiences are described as out-of-body experiences. The materialist is very eager to claim as many naturally-explicable experiences as out-of-body experiences. So he will try to use the term "out-of-body experience" to describe very many things, often things that do not have the characteristics of out-of-body experiences.

In psychiatry and neuoscience, there is a term "autoscopy," A paper states, "Autoscopy is thought to be a rare phenomenon in which a person visualizes or experiences a veritable hallucinatory image of his double." A paper states, "there is no disembodiment in autoscopy and always disembodiment in OBEs," although the later part of this statement is not correct, because in out-of-body experiences a person may report a kind of different body other than his physical body. A type of misleading statement that sometimes occurs is when materialists describe mere cases of autoscopy (which should not be called out-of-body experiences) as out-of-body experiences. These attempts to use evidence for autoscopy as part of trying to explain out-of-body experiences are misleading and also futile, because of the extreme rarity of reported cases of autoscopy, and the high incidence of cases of out-of-body experience.

Another example of misleading claims in attempts to naturally explain out-of-body experiences is when a researcher claims to experimentally produce an out-of-body experience. An example is the paper "The Experimental Induction of Out-of-Body Experiences." The paper describes a fancy high-tech experimental setup in which subjects are given something like virtual reality goggles. We read this:

"In the first experiment, participants sat on a chair, wearing a pair of head-mounted displays that were connected to two video cameras placed side by side 2 m behind the participant's back (Fig. 1A). The images from the left video camera were presented on the left eye display and the images from the right camera on the right display. Thus, the person would see his or her back with the perspective of a person sitting behind him or her with stereoscopic vision."

The author gives no justification for his claim that this very fancy high-tech setup produced any out-of-body experience. The paper gives no account by anyone describing an out-of-body experience. What is going on here is some high-tech setup designed to create perceptual confusion in subjects. Since the high-tech setup bears no resemblance to anything people would experience in normal life, the experiment in worthless in explaining out-of-body experiences, which do not occur when people are wearing virtual reality goggles. The author should not have given his paper his paper the misleading title "The Experimental Induction of Out-of-Body Experiences." An honest title would have been something like "Induction of Perceptual Confusion by Special Goggles."

Another misleading and irrelevant paper claiming to have experimentally produced an out-of-body experience is the paper "Experimental Elicitation of an Out of Body Experience and Concomitant Cross-Hemispheric Electroencephalographic Coherence." This ethically questionable paper involved zapping the brain of a single subject with some special hat containing "64 solenoids (see Figure 1) obtained from Radio Shack," until a headache was produced in the subject. Experimenting with crudely constructed brain-zapping devices not approved by the FDA was morally dubious. The paper gives no quotation from the subject describing an out-of-body experience. We read this:

"The experience culminated with the subject feeling his head was floating above the spot where his body was sitting. He could not distinguish between his limbs, his torso, or the surrounding space and objects in the room. During this intense experience, he considered asking the experimenter to

terminate the procedure. Following the experience there was noticeable fatigue and a headache developed."

This is a description of severe disorientation, confusion and pain, not matching what is reported in out-of-body experiences, in which people report painless clear perception of their body from a spot outside of their body. Since the paper does not include a first-hand account of the user's mental experiences, but merely a second-hand account of someone's mental experiences (one that may be biased by the experimenters' desire to report an out-of-body experience), the paper fails to provide any good evidence that an out-of-body experience occurred. Since the paper involves some high-tech brain-zapping setup unlike anything existing when ordinary people have out-of-body experiences, such a paper is worthless in explaining out-of-body experiences.

With the misleading stories and papers I have cited, neuroscientists and materialists are trying to make it look a little bit like they have some neural or natural explanation for near-death experiences or out-of-body experiences. They have no such thing. The phenomena of near-death experiences and out-of-body experiences are utterly inexplicable under the dogmas and assumptions of most neuroscientists and materialists, such as the dogma that the brain produces the mind or the dogma that mind states are mere brain states. All the things we see occurring in near-death experiences and out-of-body experiences are things that should not be occurring if such dogmas and assumptions are correct. Near-death experiences and out-of-body experiences are evidence that such dogmas and assumptions are incorrect. It would be hard to imagine a more resounding refutation of the dogma that your brain makes your mind than what is reported in out-of-body experiences: people observing their bodies from outside of their bodies.

at October 30, 2022 No comments:

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Head Truth

The huge case for thinking minds do not come from brains

Sunday, October 23, 2022

Poorly Designed Brain Scan Experiments Needlessly Put the Needy at Risk

Neuroscientists commonly do brain scan studies that use small study group sizes of fewer than 20 subjects per study group. Not long ago a press release from the University of Minnesota Twin Cities announced results which indicate that such small-sample correlation-seeking brain imaging experiments are utterly unreliable. The headline of the press release is "Brain studies show thousands of participants are needed for accurate results."

In the announcement we read this:

"Scientists rely on brain-wide association studies to measure brain structure and function—using MRI brain scans—and link them to complex characteristics such as personality, behavior, cognition, neurological conditions and mental illness. New research published March 16, 2022 in Nature from the University of Minnesota and Washington University School of Medicine in St. Louis...shows that most published brain-wide association studies are performed with too few participants to yield reliable findings."

The abstract of the paper in the science journal Nature can be read here. The paper is entitled, "Reproducible brain-wide association studies require thousands of individuals."

The press release tells us this:

"The study used publicly available data sets—involving a total of nearly 50,000 participants—to analyze a range of sample sizes and found:

- *Brain-wide association studies need thousands of individuals to achieve higher reproducibility. Typical brain-wide association studies enroll just a few dozen people.*
- *So-called 'underpowered' studies are susceptible to uncovering strong but misleading associations by chance while missing real but weaker associations.*
- *Routinely underpowered brain-wide association studies result in a surplus of strong yet irreproducible findings."*

The paper was released in March, 2022, but there is so far no sign that universities and neuroscientists are paying much attention to its very important findings. Universities continue to release shoddy press releases making dubious claims about the results of low-quality neuroscience experiments that use MRI scanning, poorly designed experiments that use fewer than 15 subjects per

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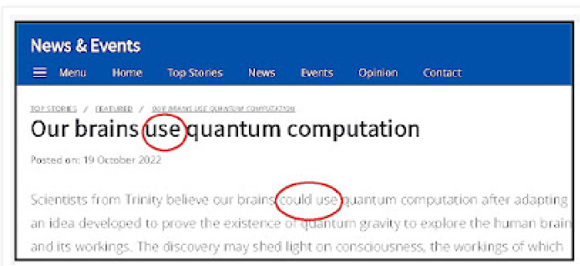
study group. A recent example is a Carnegie Mellon University press release trying to insinuate that neuroscientists have found something about "how abstract concepts are represented in the brain." No such thing has happened, because the study was yet another brain scan study using way too small study group sizes.

A look at the paper reveals that the study group sizes were only 10 subjects per study group. Failing to follow any blinding protocol, failing to do any sample size calculation, and failing to report any effect size, the study offers no robust evidence for anything. For the sake of this poorly designed study, twenty subjects (10 in each study group) had their brains scanned for 1 hour with a 3T scanner that may have health risks that I discuss below. Besides wasting federal funds, such studies may actually be putting subjects at risk by exposing them to long unnecessary brain scans that may have negative health effects, particularly decades down the road.

Another poorly designed brain scan study is a study announced with the press release below. The red circling shows one of countless examples I can give of how university press releases shamelessly hype, distort and exaggerate (a far-fetched speculation that brains might possibly use quantum computation is announced as simply a finding that brains do use quantum computation):



The study in question needlessly subjected 40 subjects to brain scanning with a 3T scanner (possibly dangerous for reasons discussed below). It seems nothing worthwhile was accomplished in the way of good experimental science because of the poor design of the study. It was not a pre-registered study; the study did not follow any blinding protocol; and there was no sample size calculation to determine whether the study group sizes used were adequate. Failing to meet any of the main hallmarks of a good experimental study, the study fails to report any effect size, fails to report any statistical significance, and mentions study group sizes way too small, including one group of only seven subjects and another group of only five subjects. The study refers to "1000 scans," causing me to worry about how much radiation these subjects were needlessly subjected to for a study so poorly designed.

An example of a poorly designed study which may have needlessly put many at risk was the study "Human cerebellum and corticocerebellar connections involved in emotional memory enhancement." Unlike the vast majority of neuroscience experiments, this study used a large sample size, and consisted of 1418 people who were brain-scanned. Unfortunately, the results are pretty worthless, because of a failure of the scientists to follow best practices. The paper makes no mention of a blinding protocol, an essential for a paper like this to be taken seriously. The study was not a pre-registered study. There was no declaration before gathering of a specific hypothesis to be tested, and a protocol of how data would be gathered and analyzed. So the scientists were

- A Soul Might Explain Instincts, but DNA and Brains Cannot
- Five Hallmarks of an Information Storage System (None of Which Your Synapses Have)
- Your Physical Structure Did Not Arise Bottom-Up, So Why Think Your Mind Did?
- Why a "Mechanical Memory" Theory Does Not Work
- The Brain Seems to Have No Mechanism for Reading or Writing Memories
- No One Understands How a Brain Could Generate Ideas
- Prevailing Brain Dogmas Cannot Explain Hypnotic Phenomena
- 30 Reasons for Rejecting the Theory of Neural Memory Storage
- Common Experiences That Show the Untruth of Professorial Memory Claims
- Neuroscience Research Customs Guarantee an Abundance of Junk Science
- Groupthink and Peer Pressure Make It Taboo for Neuroscientists to Put Two and Two Together
- The Social Construction of Eager Community Mirages
- Preprint Server Counts Suggest Engrams Are Not Really Science
- Engrams Are Touted Like Phlogiston Was Once Touted
- Synaptic Delays Mean Brain Signals Must Move at a Snail's Pace
- Raven Smarts Defy Prevailing Brain Dogmas
- No One Can Credibly Explain Why a Brain Would Store a Memory in One Specific Spot
- Brain Dogmas Versus Case Histories That Refute Them
- Inaccurate Titles and Misleading Citations Are Common in Science Papers
- In Neuroscience Papers Bluffing Is More Common Than Candor
- Young Age of Languages Contradicts Claims of Neural Storage of Linguistic Information
- Vacillating Disarray of the Memory Trace Theorists
- Study Finds "Poor Overall Reliability" of Brain Scanning Studies
- "Brains Store Memories" Dogma Versus the Reality of Noisy Brains
- The Brain Has Nothing Like 7 Things a Computer Uses to Store and Retrieve Information

free to keep slicing and dicing the data until they squeezed out a little "statistical significance" from some nook or cranny. The authors failed to report any specific percent signal change produced during memory activity. They fail to report results of any impressive statistical significance. Their best result is a mere "$p < 0.05$," which is scarcely worth even reporting. Many (such as the seventy experts who authored this paper) think that the criteria for statistical significance should be tightened, so that nothing should be reported as being statistically significant unless it has $p < 0.005$.

The subjects undergoing a half hour of brain scanning were paid a mere 25 Swiss Francs per hour that they were scanned, a trifling sum to be paid for being exposed to a significant risk. The subjects were brain scanned for 30 minutes (a medical MRI scan takes maybe 15 minutes). The more dangerous type of 3T scanner was used, a scanner type that has the possible health risks described below.

We can imagine the people who showed up for such a poor payment, amounting effectively to maybe $5 or $10 an hour (when you take into account transportation time, the time needed to exclude subjects facing higher risks by scanning, the training time required before scanning, and the time waiting for an MRI scanner to become ready). In general only the financially neediest people would have been induced by such a paltry payment. Similarly, the poorly designed GABA study described in this post subjected children to unnecessary brain scans by a powerful 3T scanner, and paid them a mere 25 pounds (nowadays worth about 28 dollars). What parent would allow such a thing for so a small a sum? Perhaps only one so needy as to have trouble feeding his child adequately.

It is a dogma among neuroscientists that MRI scans are safe. But we should remember that neuroscientists are very dogmatic creatures who often repeat claims that are dubious and unproven (as you can tell by reading the posts on this blog). Do we really know that MRI scans are free of any risk?

One danger of MRI scans is well-known: the risk of the very strong magnets used by such machines causing some metal object to be hurled at a high speed, causing injury or death. In 2001 a six-year-old boy was killed in the US during an MRI scan, when the machine turned an oxygen canister into a flying projectile. There is always a risk of lingering psychological trauma when certain people are put in some noisy high-tech machine and told they must be silent and not move for a long time such as an hour. There is also the risk that the more powerful MRI scans may raise the risk of cancer in the person getting the scan.

In the wikipedia.org article for Functional Magnetic Resonance Imaging, we read the troubling passage below:

"Genotoxic (i.e., potentially carcinogenic) effects of MRI scanning have been demonstrated in vivo and in vitro, leading a recent review to recommend 'a need for further studies and prudent use in order to avoid unnecessary examinations, according to the precautionary principle'. In a comparison of genotoxic effects of MRI compared with those of CT scans, Knuuti et al. reported that even though the DNA damage detected after MRI was at a level comparable to that produced by scans using ionizing radiation (low-dose coronary CT angiography, nuclear imaging, and X-ray angiography),

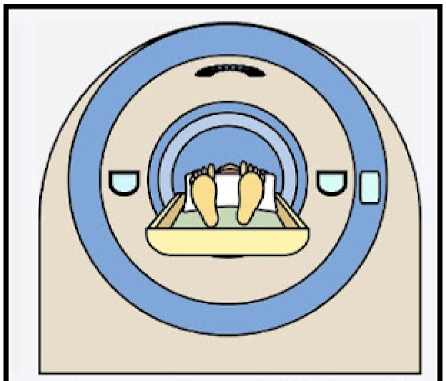
differences in the mechanism by which this damage takes place suggests that the cancer risk of MRI, if any, is unknown."

The 2009 study here ("Genotoxic effects of 3 T magnetic resonance imaging in cultured human lymphocytes") cautions about the use of a high-intensity ("3T and above") MRI, and states that "potential health risks are implied in the MRI and especially HF MRI environment due to high-static magnetic fields, fast gradient magnetic fields, and strong radiofrequency electromagnetic fields," also noting that "these results suggest that exposure to 3 T MRI induces genotoxic effects in human lymphocytes," referring to effects that may cause cancer.

A paper tells us the following about the newer twice-as-powerful 3T MRI machines that have been replacing the older 1.5T MRI machines, suggesting their magnetic fields are much stronger than the strength needed to lift a car:

"The main magnetic field of a 3T system is 60,000 times the earth's magnet field. The strength of electromagnets used to pick up cars in junk yards is about the field strength of MRI systems with field strengths from 1.5-2.0T. It is strong enough to pull fork-lift tires off of machinery, pull heavy-duty floor buffers and mop buckets into the bore of the magnet, pull stretchers across the room and turn oxygen bottles into flying projectiles reaching speeds in excess of 40 miles per hour."

A 2021 paper on MRI safety makes the not-very-reassuring claim that "no conclusive proof of harmful biological effects has been found to be caused by the static magnetic field up to 7T." This sounds like what cigarette manufacturers told us for years between 1950 and 1970, that there was no *conclusive proof* that cigarettes cause cancer (now such conclusive proof exists). When there is no evidence at all that something is harmful, a person will say something like "there is not a shred of evidence that it is harmful." When there exists some evidence suggesting a danger, a person may claim that there is "no conclusive proof" of harm.



Needlessly putting the needy at risk, usually for the sake of junk science

Will some of these subjects who participated in the usual poorly-designed brain scan studies end up with cancer decades from now because they were subjected to 30 to 60 minutes of unneeded 3T MRI scanning which "induces genotoxic effects" according to the previously cited paper? We'll probably never know, because neuroscientists don't seem to keep track of the long-term health results of the people they have brain-scanned in their experiments. It's kind of a policy of "scan 'em and forget 'em." Our neuroscientists are fond of saying there is "no proof" that MRI imaging can be harmful, but that's because they are not doing the long-term patient health followup tracking to determine whether MRI imaging produces a greater risk of cancer over 30 years or 40 years.

Don't put me down as being anti-MRI (I've had an MRI myself, after being advised by a doctor to do so). In countless medical treatment cases, the benefits of an MRI scan are greater than the small risks. But people should not be put at risk by getting unnecessary brain scans solely for the sake of poorly designed studies that fail to prove anything because they followed Questionable Research Practices.

I am not at all suggesting anyone should avoid an MRI scan when a doctor recommends such a thing as medically advisable. But it is rather clear that in their zeal to load up their resumes with more and more brain scanning studies, our neuroscientists are rounding up too many paid subjects for unnecessary and potentially harmful brain scans. What is really tragic is that such a large fraction of experimental brain scan studies follow Questionable Research Practices so badly that they qualify as "junk science studies" failing to provide any robust evidence for anything important. It seems that very often human research subjects may be needlessly put at increased risk of cancer and other health dangers by being brain-scanned in scanners such as 3T MRIs, merely so that neuroscientists can round up more subjects for badly designed studies that do nothing to advance science because they fall very short of meeting the standards of good experimental science.

When neuroscientists say brain scans are safe, they are referring to how much health trouble is *now* observed in people whose brains are scanned. No one has done some 25-year longitudinal study on the topic of whether people whose brains were scanned with 3T MRIs have a higher chance of cancer 25 or 30 years in the future. 3T MRIs were only approved by the FDA in the year 2000.

A scientific paper states this, referring to 3T MRIs:

"An insufficient number of validated studies have been carried out to demonstrate the safety of high strength static magnetic field exposure (Shellock, 2009). While MRI has been used for many years in the clinic, at higher Tesla levels (over 3 Tesla) the technology is relatively novel. Even less information about potential negative health effects exists for specific populations such as pregnant women and children."

The 2022 paper here discusses a large range of health concerns involving MRI scanners, such as these:

"The strong static magnetic field (B0) of MRI scanners can attract and accelerate ferromagnetic objects toward the center of the machine and turn them into dangerous projectiles...The radiofrequency (RF) field that is created by RF-coils can potentially cause tissue heating, especially in the presence of implants....The Time-varying fast-switching gradient magnetic field function is a spatial encoding of the MRI signal and can stimulate muscles or peripheral nerves and induce implant heating. They also produce noise in the MRI scanner space, which can reach levels of 100 dB or more and damage the hearing system."

If I were an ethical advisor asked to approve proposals for brain experiments, I would have the following rules:

- I would never approve the use of human brain scanning for any experimental study that used fewer than 25 subjects for any of its study groups, because such studies are way too likely to produce false alarms. I would never approve the use of any brain scanning experiment that did not include a sample size calculation to determine an adequate sample size that was used as a minimum for each study group.
- I would never approve the use of human brain scanning for any experimental study that had not published publicly a detailed research plan, including a precise hypothesis to be tested, along with a very exact and detailed description of how data would be gathered and analyzed. We should not be putting people at risk for studies that do not follow best practices.
- I would never approve the use of human brain scanning for any experimental study that had not published publicly a detailed blinding protocol to be followed, discussing exactly how blinding techniques would be used to reduce the risk of experimenter bias in which the experimenter "sees what he wants to see." We should not be putting people at risk for studies that do not follow best practices.
- I would insist that any consent form signed by a subject to be brain scanned would include a detailed discussion of the reasons why brain scanning might be potentially hazardous, with negative effects appearing far in the future, along with a fair discussion of

the scientific literature suggesting such hazards. Currently a large fraction of such consent forms fail to frankly discuss such risk.

- I would never approve the use of any brain scanning on children in an experiment that did not absolutely require the participation of children.

I strongly advise all parents never to let their children participate in any brain scanning experimental study unless a doctor has told them that the brain scan is medically advisable solely for the health of the child. I advise adults not to participate in any brain scanning experimental study unless they have read something that gives them warrant for believing that the experimenters are following best experimental practices, and that there will be not be a very high chance that the adults will be undergoing unnecessary health risks for the sake of some "bad practices" poorly designed "fishing expedition" experiment that does not advance human understanding. If a neuroscientist looking for research subjects tells you that brain scans are perfectly safe, remember that many neuroscientists often dogmatically make claims that are unproven or doubtful, and often pretend to know things they do not actually know (see this site for very many examples).

I also strongly advise anyone who participated in any brain scanning experiment to permanently keep very careful records of their participation, to find out and write down the name of the scientific paper corresponding to the study, to write down and keep the names of any scientists or helpers they were involved with, to permanently keep a copy of any forms they signed, and to keep a careful log of any health problems they have. Such information may be useful should such a person decide to file a lawsuit.

When we examine the history of MRI scans, we see a history of overconfidence, and authorities dogmatically asserting that "MRI scans are perfectly safe," when they did not actually know whether they were perfectly safe. Not many years ago there arose the great "contrast agent" scandal. Scientists began to learn that what are called "contrast agent" MRI scans (given to 30 million people annually) may not be so safe. In such "contrast agent" scans, a subject is given an injection that increases the visual contrast of the MRI scan. For a long time, the main substance in such an injection was gadolinium. A mainstream cancer web site states, "Tissue and autopsy reports have also confirmed that gadolinium can accumulate in the brain and other organs." The results can be a health disaster, as described here. A 2019 Science Daily story says, "New contrast agent could make MRIs safer," letting us know that many of them previously were not so safe. On the same Science Daily web site, we read a 2017 news story with the title "MRI contrast agents accumulate in the brain." A 2020 paper ("Side Effect of Gadolinium MRI Contrast Agents") says this:

"Until recently, it was believed that gadolinium is effectively cleared within 24 hours after intravenous injection, and that it does not have any harmful effects on the human body. However, recent studies on animals and analyses of clinical data have indicated that gadolinium is retained in the body for many years post-administration, and may cause various diseases."

Neuroscientists extensively used such contrast agents (as described here), very often putting human subjects at risk for the sake of junk poorly designed studies falling far short of the best experimental practices. All the while, many

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- "Brains Make Minds" Models All Flunk a Large Brain Scan Study
- The Philosophy of Teleospiritism
- The Biggest Blunders of Theories Such as Integrated Information Theory
- Study Finds No Robust Link Between Brain Structure and Personality
- The Two Huge Mistakes Involved in Typical Talk of a "Hard Problem of Consciousness"
- Neuroscientists Keep Wrongly Assuming the Source of Something Must Be Near Its Observed Manifestations
- The Vague Unfounded Boasts of Biology Sound Like the Vague Unfounded Boasts of Astrophysics
- 8 Reasons for Doubting Claims of the Heritability of Intelligence
- Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"
- Exhibit A Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
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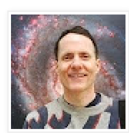

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March 2023 (2)

of our experts were making the untrue claim that "MRI scans are perfectly safe," a statement which was not clearly true for the large fraction of MRI studies that used gadolinium contrast agents. You can do a Google search for "gadolinium deposition" to learn more about this issue.

A while ago there was published a scientific paper entitled "The effects of repeated MRI on chromosomal damage." Despite making in its abstract the claim that "MRI is a safe imaging technique," the paper finds results that are worrying. We are told, "The total number of damaged cells increased by 3.2% (95% CI 1.5–4.8%) per MRI (Fig. 2d–h) (p< 0.001); this increase being higher during the first ten MRI sessions than during the last ten ones."

Is there any protocol in place to prevent subjects from being used more than once in a neuroscience brain scan study? Apparently not, because Table 1 of the paper above mentions some subjects of the Human Brain Project being given more than 25 MRI brain scans, none of them medically necessary. The blase attitude of experimental neuroscientists towards health risks to their brain scan subjects is very appalling. Not only do they fail to track the long-term health of the subjects scanned ("scan 'em and forget 'em,") but also seem to pay no attention to how many times their subjects have been scanned, ignoring cumulative risk.

Most appallingly, our neuroscientists seem to fail to honestly notify their human subjects of the risks they are undergoing before engaging in possibly dangerous 3T brain scans so that the financially needy subjects can earn trifling sums. After doing a Google search for "brain scan experiment consent form," I find several actual consent forms and "model" consent forms containing dishonest language, such as the claim that there are "no known significant risks or side effect associated with MRI scans." That is not honest language, given the statements I have discussed above. One "template" for brain scan studies recommended by a university has these ridiculously inconsistent statements (the first untrue statement being contradicted by the rest of the statements):

"There are no known significant risks or side effects associated with MRI scans...There is a risk if metal objects are near the MRI because they can be drawn into the MRI scanner
and that could hurt someone in or near the machine...There may be risks associated with this study that we do not know about. In spite of all the care and precautions taken by the investigators, you might develop medical complications from participating in this study."

One horrid form by a major university asks participants to be scanned for an hour in an MRI machine as a "dry run" to test the machine or its settings. The form states this:

"The procedure may involve unexpected risks that are impossible to predict. These unforeseen risks may affect you during your participation in the procedure and/or at some point in the future...You will not be helped by participating in this procedure....You will not be paid for participating in this study....If you are hurt as a result of participating in the 'dry run exam', we have no plans to pay you for lost wages, disability, or discomfort."

In general, the MRI consent forms I looked at totally failed to warn participants of the risk of cell damage and the increased chance of getting cancer as a result of a 1 hour 3T brain scan, something everyone should be warned of. As mentioned above, the 2022 paper "The effects of repeated brain MRI on chromosomal damage" found that "**The total number of damaged cells increased by 3.2% (95% CI 1.5–4.8%) per MRI.**" The paper was referring to "DNA breaks" that have a possibility of increasing cancer risk. The paper referred to 90-minute 3T scans much longer than the average diagnostic MRI brain scan, which takes maybe 15 minutes and presumably damages much less than 1% of cells.

A paper entitled "A massive 7T fMRI dataset to bridge 3 cognitive neuroscience and artificial intelligence" discusses some data collection in which eight subjects were brain scanned 30 to 40 times with 7T scanners twice as powerful as the 3T scanners mentioned above, with each scan being about an hour long. The paper states this:

"The total number of 7T fMRI scan sessions were 43, 43, 35, 33, 43, 35, 43, and 33 for subj01–subj08, respectively. The average number of hours of resting-state fMRI conducted for each subject was 2.0 hours, and ***the average number of hours of task-based fMRI conducted for each subject was 38.5 hours."***

This was in addition to other 3T scans the subjects were given. The paper makes no mention of any consideration of health risks to these people, who received only $30 per hour for the medically unnecessary scans. A 7T scanner would presumably have more than twice the risks of the 3T scanners discussed above.

Postscript: The latest example of needless risk to subjects is a study with a preprint entitled "Semantic reconstruction of continuous language from non-invasive brain recordings." The study failed to show any good evidence for anything important, as it used a way too-small study group size of only seven subjects (15 subjects per study group is the minimum for a moderately impressive result). Following Questionable Research Practices, the scientists report no sample size calculation, no blinding protocol, no pre-registration, no control group, and no effect size. The only "statistical significance" reported is what smells like "p-hacking" kind of results of the bare minimum for publication (merely $p < .05$). For these basically worthless results, seven subjects endured something like 16 hours of brain scanning with a 3T scanner, which is more than 30 times longer than they would have had for a diagnostic MRI. Senselessly, this study has been reported by our ever-credulous science press as some case of reading thoughts by brain scanning. It is no evidence of any such thing.

A 2005 article in Nature discusses second brains scans required in NIH-funded experiments, apparently to help clarify which subjects have brain anomalies that need to be reported to physicians. We read this about some workshop of "about 50 scientists, physicians, lawyers and ethicists":

"The NIH goes one step further by requiring its on-campus investigators to perform a clinical scan of every research subject, in addition to any research scans. But workshop participants agreed that this was not a good idea because it can expose people to unnecessary risks from extra procedures."

Labels

So the scientists seemed to agree that having two brain scans was exposing subjects to "unnecessary risks." So why are we having so many poorly designed neuroscience experiments in which so many subjects are needlessly subjected to such "unnecessary risks"? And why are some subjects being subjected to more than ten brain scans in such poorly designed experiments?

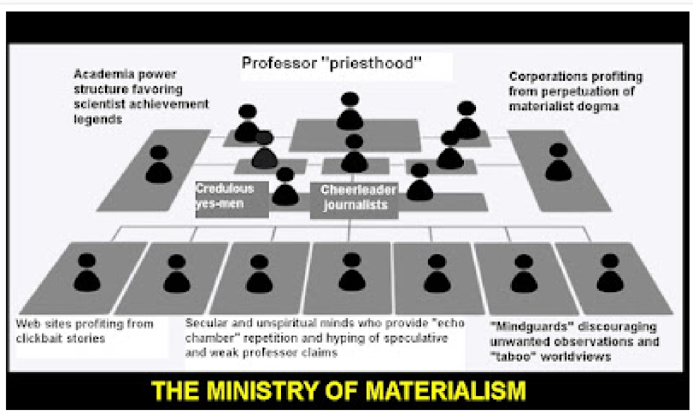
at October 23, 2022 No comments:

Labels: brain imaging, health hazards in neuroscience experiments

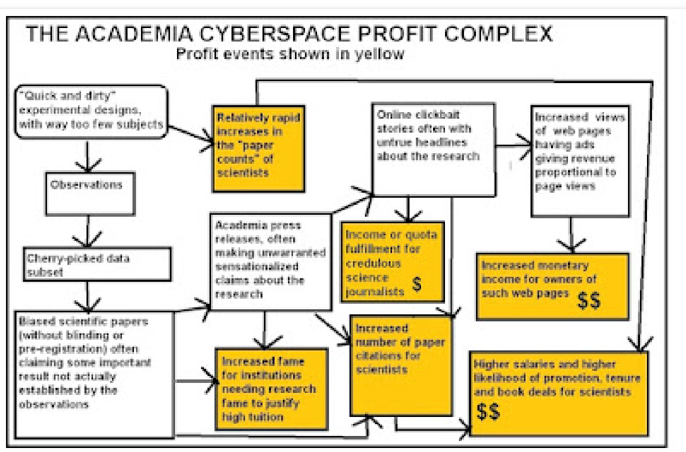
Sunday, October 16, 2022

No, Brain Cells in a Lab Dish Didn't Play Pong

Given that the agents professing the creed of materialism very much act like clergy by dogmatically professing unproven belief tenets, it seems fair enough to refer to such agents as part of a Ministry of Materialism. The diagram below gives a crude sketch of such a power structure, which is far more complicated than the diagram suggests. Key players in the power structure include the so-called skeptics mentioned at the bottom right, who do their best to suppress the reporting and studying of thousands of observations that conflict with the materialist worldview, while gaslighting, disparaging and defaming those who report or mention such observations. In psychology analysis of groupthink conformity, such agents are called "mindguards."



To properly understand this "Ministry of Materialism," you need to "follow the money," and the diagram below may help you do that. We get some clues here as to the parties that profit when dubious or misleading claims are passed around in "science news" stories.

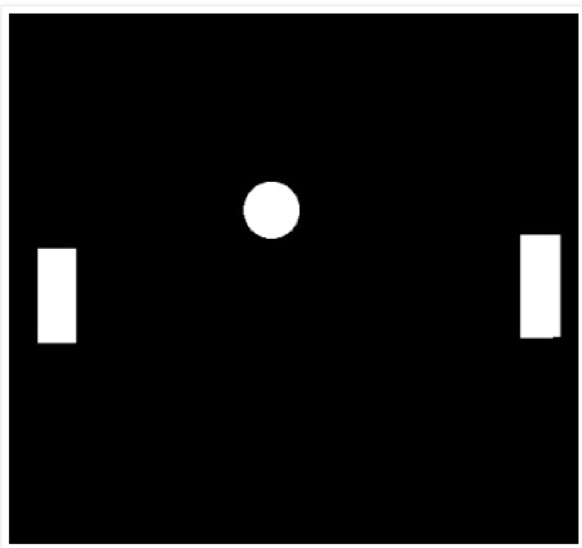


The world of so-called "science news" is like some seedy honkytonk used-car

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

sales lot where pretty much "anything goes." The latest piece of baloney coming out of this "hall of mirrors" carnival-barker world is a claim that neurons in a lab (outside of any organism) have successfully played the primitive game called Pong. For example, an NPR story has this headline: "A dish full of brain cells has learned to play the computer game Pong." The claim is without any merit.

I am old enough to remember the debut of the game Pong. On a TV show about five decades ago I was introduced to what was then a totally novel idea: that someone might play a game using his TV screen. Pong was about the most primitive video game imaginable. Two players each had controllers, allowing them to adjust the vertical position of a rectangle representing a paddle. An electronic ball would move back and forth on the screen. If a player moved the vertical position of his "paddle" rectangle to a suitable spot so that it blocked the moving ball, the ball would "bounce" by moving in the other direction, towards the other player's "paddle" rectangle. The idea would be to let the "bouncing ball" get past your "paddle" rectangle as infrequently as possible.



The Pong study discussed in yesterday's news was a study involving some system called DishBrain. The name is doubly misleading, because it didn't involve a brain, and didn't involve a dish. Instead it involved neurons on a very small electronic chip. The study's results appear in a paper with the very misleading title "*In vitro* neurons learn and exhibit sentience when embodied in a simulated game-world." What the authors created was an extremely confusing "hall of mirrors" situation in which neurons and software were all mixed up with hardware, with the scientists throwing in chemicals and electricity. They placed rodent cells and human cells on some electronic hardware they called "high-density multielectrode arrays." The very confusing mashup included "custom software drivers .. developed to create low-latency closed-loop feedback systems that simulated exchange with an environment for BNNs through electrical stimulation." With such a setup, it's very difficult to disentangle whether a response was produced by hardware, software or neurons.

But there are some things that are very clear. The first is that the scientists followed Questionable Research Practices, as typically occurs whenever any

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

cognitive neuroscience study claims impressive results. In the section of the paper entitled "Sample size and blinding protocols," we read this:

"No statistical methods were used to predetermine sample size. As all work was conducted within controlled environments uninfluenced by experimenter bias, experiments were not randomized, and investigators were not blinded to experimental condition."

Here the researchers confess that they failed to use statistical methods to calculate a required sample size, which is a very serious shortcoming. In the paper there are indications that sample sizes too small may have been used. We should not at all accept the lame excuse given for a failure to follow a blinding protocol, the excuse that "all work was conducted within controlled environments uninfluenced by experimenter bias." There would be abundant opportunities for experimenter bias in the collection and interpretation of data in an experiment like this, and in the construction of such "controlled environments." No experiment such as this should be taken seriously unless the researchers declared and followed a rigorous blinding protocol, and the researchers did no such thing.

The researchers did not actually produce the slightest bit of evidence of Pong playing by the neurons in their bizarre "mix the software and neurons and hardware" setup. Why is that? To actually play Pong requires muscle action. To play Pong you need to use muscles to adjust a controller. Such muscle action requires volition. The setup of the experimenters involved zero muscle involvement, zero evidence of volition, and zero evidence of Pong being played by neurons.

The version of Pong described in the paper wasn't even Pong, as it involved a single moving paddle rather than two (and a paddle much bigger than in the original Pong). The paper describes a "witch's brew" conglomeration of rodent cells, human cells, software, hardware, chemicals, and voltages. When software and hardware and neurons are all mixed up and entangled, in some "black box" complex system, it is easy to pass off software responses as neuron responses. We can be quite sure that the neurons were in no sense whatsoever playing Pong, because the neurons were not connected to any muscles. You can't play Pong without muscle action. What we have here seems to be neuron-entangled software/hardware/chemical action that is being misleadingly passed off as neuron action.

We read that voltage was applied to cells to tell them where the Pong ball was: "75 mV was chosen as the sensory stimulation voltage that would relate to where the ball was relative to the paddle as described in the main text to key electrodes." Then we have some passage letting us know that some objectionable algorithm was being used in which these voltage spikes were being treated as if they were motor activity (what happens when muscles move):

"Spikes are themselves optionally recorded in binary files, and regardless of recording are counted over a period of 10 milliseconds (200 samples), at which point the game environment is given the number of spikes detected in each of the configured electrodes in predefined motor regions as described below. These spike counts are interpreted as motor activity depending on which motor region the spikes occurred in, thereby moving the 'paddle' up or down in the virtual space."

So we have here some shady trick in which neurons are being zapped with voltage inputs corresponding to the moving Pong ball's position, and then readings of these voltages in these neurons (via spike counts) are being interpreted as muscle movements, even though the neurons were not actually connected to muscles. This isn't learning. It's just zapping some neurons, and then reading voltage spikes that arose because of your zapping of neurons. Claiming that kind of thing is learning is like stepping in some mud, and then claiming that the mud is learning something about the shape of your foot.

Yes, you can jolt neurons with some voltages, and then read back voltages arising from the electricity you supplied, using that to determine a Pong paddle position. You can also supply a metal capacitor with a particular voltage, and then read back the amount of voltage that is in the capacitor. But neither operation does anything to show that neurons or capacitors are capable of learning how to do things. Such operations merely show that neurons and capacitors can be set to "store a particular number" for a while. Similarly, you can heat water up to have some particular temperature, and then read that temperature with a thermometer. For a while, the water will be "storing" that temperature you gave it. But that does not mean the water is learning anything long-term.

I can summarize this DishBrain experiment:

Evidence of muscle action: zero.

Evidence of volition: zero.

Evidence of neurons actually playing Pong: zero.

As for the scientists claiming evidence of learning and sentience (in the title of their paper), the claim is as baloney as someone stepping in the wet snow, and saying this proves that snow is learning and sentient, on the grounds that the snow has *learned* the shape of your foot, and is now *aware* of your shoe shape. The Cambridge Dictionary defines "sentience" as "the quality of being able to experience feelings," and no such thing was going on here.

What goes on in misleading experiments such as this is that at the heart of things is a trick. But the experimenters don't want you to see the simple trick that was being used, so they throw in all kinds of bells and whistles and distractions and complications to minimize the chance that you will see the simple trick that was used. Here the simple trick was mainly supplying neurons with some voltages corresponding to a ball position on a computer screen, and then reading the voltages of neurons to get some number corresponding to the voltage that was supplied, while then representing such voltage readings as paddle movements (even though they were no such thing, because the neurons -- being unconnected to muscles -- did not move anything). The trick was all entangled with some complicated rigmarole so that the chance of you detecting the trick was minimized. Similarly, a magician doing some trick will surround his trick with various distractions that will minimize the chance of you detecting how the trick occurred. We can call this kind of thing a "parlor trick experiment."

It would be futile to defend this procedure by mentioning that there was a tiny physical difference between a "sensory area" of neurons and a "motor area" of neurons, because both areas existed on a chip so tiny (8 square millimeters, only about 3 millimeters wide) that electrical inputs into a "sensory area" of neurons would have been essentially equivalent to inputs into the "motor area" of neurons, particularly given neural connections between the areas and an underlying chip helping to cause electricity to spread around more quickly between the two tiny areas.

I may note a nonsensical claim in the title of the paper ("*In vitro* neurons learn and exhibit sentience when embodied in a simulated game-world"), the claim that neurons can be "embodied" in a simulated game-world. Neurons are incredibly organized and complex three-dimensional physical things, and cannot be "embodied" in any primitive minimalist 2D video game such as Pong.

at October 16, 2022 3 comments:

Sunday, October 9, 2022

The Evidence Inversion Syndrome Blights Academia

It is a myth widely spread by scientists that when someone becomes a scientist he adopts some regime of logical thinking in which he believes according to the evidence. The truth is that you do not have to have any great training in logical thinking to become a scientist, and some scientists are guilty of believing contrary to the evidence. Many scientists fall into one of the worst types of thought traps a person could fall into, something I may call the *evidence inversion syndrome.*

The evidence inversion syndrome occurs when someone has a state of mind in which evidence against a hypothesis he cherishes is treated as if it is evidence for the hypothesis; and even stronger evidence against the hypothesis is treated as even stronger evidence for the hypothesis. Similarly, evidence for a hypothesis he dislikes may be treated as if it is evidence against the hypothesis; and even stronger evidence for the hypothesis is treated as even stronger evidence against the hypothesis. To explain the concept, I can give some hypothetical examples involving ordinary people.

Let us imagine an old man living in Vermont who notices that during the winter his 10-meter front sidewalk was snow-shoveled by his neighbor. Suppose the old man's hypothesis is that his next-door neighbor is a cruel and thoughtless person. Now, the removal of snow from the old man's front sidewalk should be taken as evidence of the neighbor's benevolence. But instead the old man treats the shoveling as evidence of the neighbor's wickedness, claiming that the neighbor is trying to make it more likely the old man will slip and fall on hard concrete rather than soft snow. The old man has fallen into an evidence inversion trap. If the kindly next-door neighbor shovels the old man's walk many times during the winter, the old man may take this as all-the-stronger evidence of the wickedness of his neighbor, on the grounds that this will increase all the more the old man's chance of slipping and falling on hard concrete rather than soft snow. And if the next-door neighbor ever gives the old man a big apple pie, the old man may treat this as even stronger evidence of the next door neighbor's wickedness, on the grounds that the pie has probably been poisoned.

I can think of another example of the evidence inversion syndrome inflicting a person. Let us imagine a man named John who is a passionate supporter of Senator Smith in his run for the US presidency. Let's suppose Senator Smith is running against a Governor Jones. Now suppose a poll shows that 80% of the people will vote for Governor Jones. John may take this as very good evidence that Senator Smith will win, on the grounds that clearly Senator Smith is the better candidate, so if the polls show 80% favoring Senator Smith's rival, that just shows that the polls are rigged.

Now, whatever results may be reported in the election, John will take them as being proof that Senator Smith won the election. If it is reported that Senator Smith got 60% of the votes, that will be embraced by John as proof that Senator Smith won fair and square. If on the other hand it is reported that Senator Smith's rival Governor Jones got 60% of the votes, that also will also be taken by John as proof that Senator Smith won the election, on the grounds that it shows that the voting was rigged. If it happens to be reported that 90% of the voters voted not for Senator Smith but for his rival Governor Jones, this will be interpreted by John as all the more decisive evidence that Senator Smith won the election, on the grounds that it proves all the more decisively how rigged the election was. John has fallen into the deep, deep hole of an evidence inversion syndrome. Evidence fhat should be interpreted as evidence for Senator Smith's defeat in the election will instead always be interpreted by John as evidence for Senator Smith's victory in the election.

There is a type of evidence inversion syndrome that can occur among the devotees of Darwinism. Darwinism is the theory that the impressive wonders of biology all were the result of mere random mutations, with a survival-of-the-fittest effect occurring, causing luckier random mutations to be more likely to be preserved. Darwinists use the term "natural selection" for this claimed effect, although that term is misleading, because no actual selection is involved. Selection means a choice by a conscious agent, and Darwinists do not think that such a choice is occurring when so-called natural selection occurs.

Now, it is generally true that the more organization is involved in something, and the more parts that are well-arranged in that thing, the less plausible are claims of a purely natural origin of that thing. For example, if I am at the beach, and I claim that a certain lump of wet sand was formed by purely natural processes, that claim may have some credibility. But imagine at the beach there is some gigantic sand castle quite a few meters tall, looking like it was a very elegant design produced by a master architect, something rather like the sand castle below:

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It would seem that any claim of natural origins of such a thing would be preposterous. The example here illustrates a simple point: the greater the organization in something, and the more well-arranged parts the thing has, the more implausible-sounding are claims that such thing arose by purely natural processes.

Given such a principle, there is a particular fact of the history of biology that should be extremely troubling for Darwinists. The fact is that the amount of discovered organization and the degree of seemingly fine-tuned arrangement of parts in biological organisms has risen exponentially since the time of Darwin. In Darwin's time scientists knew very little about the functional complexity and systemic interdependencies of living things. We now know that every human body is a more impressive work of engineering and organization than a passenger jet with thousands of well-arranged parts. Now we know about the complexities mentioned in the table below, most of which were unknown to Darwin, who knew nothing about the complexities of cells or protein molecules.

HUMANS CONSIST OF HUMAN BODIES AND HUMAN MINDS.	Human minds have displayed a vast number of capabilities, many of which mainstream scientists fail to properly study.
HUMAN BODIES MAINLY CONSIST OF ORGAN SYSTEMS AND A SKELETAL SYSTEM.	The human skeletal system contains 206 bones.
ORGAN SYSTEMS CONSIST OF ORGANS AND SUPPORTING STRUCTURES.	Examples of organ systems include the circulatory system (consisting of much more than just the heart), and the nervous system consisting of much more than just the brain.
ORGANS CONSIST OF TISSUES.	
TISSUE CONSIST OF CELLS.	There are roughly 200 types of cells in the human body, each a system of enormous organization.
CELLS TYPICALLY CONSIST OF COMPLEX MEMBRANES AND THOUSANDS OF ORGANELLES.	• A cell diagram will typically depict a cell as having only a few mitochondria, but cells typically have many thousands of mitochondria, as many as a million. • A cell diagram will typically depict a cell as having only a few lysosomes, but cells typically have

	hundreds of lysosomes. • A cell diagram will typically depict a cell as having only a few ribosomes, but a cell may have up to 10 million ribosomes. • A cell diagram will typically depict one or a few stacks of a Golgi apparatus, each with only a few cisternae. But a cell will typically have between 10 and 20 stacks, each having as many as 60 cisternae.
ORGANELLES CONSIST OF VERY MANY PROTEIN MOLECULES AND PROTEIN MOLECULE COMPLEXES.	There are some 100,000 different types of protein molecules in the human body, each a complex invention. Protein molecule complexes are groups of protein molecules that work together to achieve a function that cannot be achieved by only one of the proteins in the complex.
PROTEIN MOLECULES CONSIST OF HUNDREDS OF WELL-ARRANGED AMINO ACIDS, EXISTING IN A FOLDED THREE-DIMENSIONAL SHAPE.	Small changes in the sequences of amino acids in a protein are typically sufficient to ruin the usefulness of the protein molecule, preventing it from folding in the right way to achieve its function.
AMINO ACIDS CONSIST OF ABOUT 10 ATOMS ARRANGED IN SOME SPECIFIC WAY.	Some amino acids have 20 atoms. Given 10+ atoms in amino acids, a protein molecule contains an average of about 4000+ well-arranged atoms. Amino acids in living things are almost all left-handed, although amino acids forming naturally will with 50% likelihood be right-handed.

ATOMS CONSIST OF MULTIPLE PROTONS, NEUTRONS AND ELECTRONS.	A carbon atom has 6 protons, 6 neutrons, and 6 electrons.

Now, under sound normal reasoning, it would seem that all of this gigantic functional complexity and fine-tuned arrangement of parts would seem to be evidence against Darwinist claims that everything in biology has arisen by blind natural processes. But in the mind of many a Darwinist, there is an evidence inversion syndrome under which the thinker may claim that such evidence shows all the more decisively that Darwinism is true. The twisted reasoning goes like this: if modern science has now discovered that organisms require a billion times greater a suitable arrangement of parts than Darwin ever realized, that just proves all the more strongly the power of natural selection to create inventive wonders of biological engineering.

Similarly, if a person believes that everything in his neighbor's backyard was built by fairies, he may not be discouraged by coming back from his vacation and finding a new deluxe concrete swimming pool in his neighbor's backyard, one equipped with many ornate marble sculptures of swans and dolphins. This person may claim that this just proves all the more decisively the power of fairies to build things. This also involves an evidence inversion syndrome.

We see the evidence inversion syndrome going on in the minds of many a neuroscientist. For example, a father employed as a French civil servant was found to have almost no brain. This was evidence against claims that the mind is made by the brain. But to some neuroscientists an evidence inversion went on. They claimed that this was merely all the more proof of the astonishing power of the brain. We can imagine them thinking to themselves: "That just shows all the more powerfully the miracle power of neurons!"

Similarly, if may be pointed out to a neuroscientist that no one has ever found a memory in the brain of a dead person, and no one has ever learned anything about what a person learned or experienced by examining the brain of a recently deceased person. The neuroscientist should regard this as evidence against his belief of a neural storage of memory. But he may say something like, "That just shows another of the endless marvels of the brain: its ability to store memories in so tiny a manner that our super-powerful microscopes can't even find them."

Similarly, it is often pointed out to neuroscientists that while they claim that memories are stored in synapses, in truth synapses consist of proteins that last only a few weeks or less, and synapses are subject to constant random remodeling and random restructuring which makes them utterly unsuitable for storing memories that can last for decades or even years. The neuroscientist will say this just proves what marvelous molecular machines synapses are, and may claim synapses have the ability to maintain their information content despite a constant physical restructuring, like some book that automatically maintains all its words while replacing every one of its pages many times every year. If you point out that no things humans have ever invented have ever had such a capability, the neuroscientist may say that just proves the brain is the most complex thing in the universe, capable of wonders beyond that of any human machinery.

The evidence inversion syndrome also appears when neuroscientists confront the paranormal. If you present them with a case of someone saying he floated out of his body and saw it from above, the neuroscientist treats this as a hallucination. If evidence is presented that a significant fraction of all people report having such an experience in their lives, the neuroscientist will say that this just shows that it is a purely brain phenomena, or else so many people would not report it. If evidence is presented (as it often is) that during such out-of-body experiences some person discovered something he did not know and should not have been able to find out about if we was merely hallucinating, the neuroscientist will claim that this is just more proof of the boundless powers of the brain, including a power to so often make lucky correct guesses. If all people reported floating out of their bodies ten times every month, the neuroscientist would then cite this as proof that it must be some common material experience, because so many people are reporting it.

It's the same thing for apparition sightings. If 100 people report seeing apparitions of their dead relatives, the neuroscientist will claim such reports as hallucinations. If it is reported (as it has been reported) that a significant fraction of the human population (as high as 30%) have deathbed visions of their deceased relatives, the neuroscientist uses this frequency as proof of the commonness and naturalness of such reports. (A survey of family members of deceased Japanese found that 21% reported deathbed visions. A study of 103 subjects in India reports this: "Thirty of these dying persons displayed behavior consistent with deathbed visions-interacting or speaking with deceased relatives, mostly their dead parents." A study of 102 families in the Republic of Moldava found that "37 cases demonstrated classic features of deathbed visions--reports of seeing dead relatives or friends communicating to the dying person.")

If every single person in the world were to report seeing and hearing their dead relatives every week, the neuroscientist would claim this as proof that there must be some common brain glitch causing people to see and hear their dead relatives. If many people report (as they have done) seeing apparitions of their dead relatives or friends at the time such relatives or friends died, before they knew of such deaths, the neuroscientist will say this just proves that incredibly improbable coincidences often happen. If multiple witnesses report seeing the same apparition (as has happened many times), the neuroscientist will say that this just proves that brains must be the source of our minds, because they can cause mass hysteria.

You may carefully cite to a neuroscientist some of the more spectacular cases in the history of the paranormal, well-documented cases of minds acting with powers or experiences utterly inexplicable of explanation through any idea of brain function, cases witnessed and carefully described by distinguished doctors and professors and investigative committees. The neuroscientist may claim that such cases just prove all the more decisively that those reporting the paranormal must be crazy or liars, on the grounds that obviously someone is lying or hallucinating if he describes some mental action that cannot be explained by the brain.

In all these cases, what is going on is people taking evidence that should be regarded as evidence for human souls, and trying to twist it into evidence against human souls, and for the dogma that brains make minds. Like most people who suffer from the evidence inversion syndrome, many a neuroscientist is very ingenuous at trying to make evidence against his belief dogmas sound like evidence for his belief dogmas.

Basically there is nothing that can ever convince people who have been blighted by the evidence inversion syndrome to change their minds about some cherished belief, for they have bottomless ingenuity in explaining away all evidence against their beliefs, and violently twisting such evidence into something that they can say is evidence for their beliefs. Such people have an endless capacity for claiming that something that looks black is really white, and that something that looks white is really black.

Of all the cases of the evidence inversion syndrome that have occurred in human thinking, the most dramatic cases are those involving multiverse reasoning. Physicists and cosmologists have discovered many powerful reasons for suspecting that our universe was very precisely fine-tuned to allow the existence of living creatures such as ourselves. One of the most dramatic examples involves the very precise equality of the absolute values of the proton charge and the electron charge. In our universe each proton has a mass 1836 times greater than the mass of each electron. But the electric charge of each proton is one particular value (+ 1.602176634 x 10^{-19} Coulomb) that is the very precise opposite of the electric charge of each electron (-1.602176634 x 10^{-19} Coulomb).

On pages 64-65 of his book "The Symbiotic Universe," astronomer George Greenstein (a professor emeritus at Amherst College) said this about the equality of the proton and electron charges (which have precisely the same absolute value):

"Relatively small things like stones, people, and the like would fly apart if the two charges differed by as little as one part in 100 billion. Large structures like the Earth and the Sun require for their existence a yet more perfect balance of one part in a billion billion."

In fact, experiments do indicate that the charge of the proton and the electron match to eighteen decimal places. The example given here is one of only many cases of very precise fine-tuning in our universe needed for it to be habitable (other cases are discussed here). Because of the dependency of stars on a very delicate fine-tuning of fundamental constants, you can state it this way: a random universe would be both lifeless and lightless. The table below lists some of the fine-tuning and interlocking dependencies by which our universe is habitable.

Item	Requirements (Direct or Indirect)
Higgs field	Fine-tuning to 15 decimal places
Up quark, down quark, electrons	Currently unexplained matter/antimatter asymmetry, Higgs field
protons, neutrons	up quark, down quark
hydrogen atoms	protons, electrons, electromagnetic force
Galaxies	Fine-tuning of expansion rate, density perturbations, dark energy, dark matter, photon/baryon ratio, gravitation
carbon atoms	Protons, neutrons, electrons, Pauli Exclusion Principle, electromagnetic force, strong nuclear force, nuclear resonances producing carbon in stars
Oxygen atoms	Protons, neutrons, electrons, Pauli Exclusion Principle, electromagnetic force, strong nuclear force, nuclear resonances producing oxygen in stars, weak force
Heavier atoms (with more than about 25 protons)	Protons, neutrons, electrons, Pauli Exclusion Principle, electromagnetic force, strong force, weak nuclear force and neutrinos causing supernovae
Sunlike stars	Galaxies, fine-tuning of (1) gravitation (2) electron mass (3) Planck's constant (4) speed of light
water	Oxygen atoms, hydrogen atoms
Stable planets	Gravitation, equality of proton charge and electron charge to many decimal places (for planet to hold together)
Nucleotides	oxygen atoms, carbon atoms, molecular bonding requirements
Genetic code	Huge enigmatic requirement -- "programming code from chemicals"
RNA	Nucleotides, Genetic code, water
DNA	RNA, nucleotides,Genetic code, water
Proteins, cells	DNA, RNA, Genetic code, water
Photosynthesis	Exotic quantum effects
Civilizations near sunlike stars	Heavier atoms, sunlike stars, stable planets, proteins, cells, photosynthesis, important unknown other requirements allowing Mind to arise from matter

Faced with such evidence that we live in a purposeful universe which was very precisely fine-tuned to have the conditions needed for stars and planets and living creatures, how is it that such evidence is treated by atheistic physicists? Such physicists claim that such evidence shows that there must be some infinity or near infinity of random purposeless universes, and that our universe was just the luckiest of such universes. So given evidence that our universe is not random, but the product of purposeful intention, such physicists claim that such evidence is evidence not for one purposeful universe but instead evidence for some near infinity of random, purposeless universes. This is every bit as silly as someone getting evidence that a two-year-old child *does not* understand quantum mechanics, and claiming that such evidence shows that there must be a million billion trillion quadrillion small children who *do* understand quantum mechanics.

The multiverse reasoning of atheistic physicists is the most dramatic case example in history of the evidence inversion syndrome. Such physicists take very dramatic evidence of purpose, and claim that it is evidence for an infinity or a near-infinity of purposeless randomness. Such is the "hall of mirrors" madhouse that can arise when the evidence inversion syndrome occurs, under which evidence for whiteness is treated as evidence for blackness, and evidence for blackness is treated as evidence for whiteness. If there is a wiser age following this age of academia foolishness, such an age may regard the multiverse reasoning of atheistic physicists as being the lowest nadir of reasoning degradation, the most topsy-turvy perversion of the logical thinking that was supposed to be the basis of physics.

at October 09, 2022 3 comments:

Sunday, October 2, 2022

Brain Imaging Shows No Appreciable Neural Correlates of Memory Activity

There have been many brain scanning studies of how a brain looks when particular activities such as thinking or recall occur. Such studies will typically attempt to find some region of the brain that shows greater activity when some mental activity occurs. No matter how slight the evidence is that some particular region is being activated more strongly, that evidence will be reported and reported as a “neural correlate” of some activity. But a question we should be asking is: do any such studies actually show appreciable evidence of any neural correlate of the activity under examination?

We should not be starting out by asking, "Which region of the brain changes most when a mental activity occurs?" The first and most fundamental thing to consider is: does there exist appreciable evidence of any correlation between brain states and higher mental activity? Similarly, it is a mistake to start asking, "Which person's face appears most commonly in the clouds?" It is much better to start with a simpler question such as "Is there appreciable evidence of any person's face appearing in the clouds?"

There are several types of memory activity that can be identified:

(1) The acquisition of a new episodic memory through experience.

(2) The learning of a new physical skill by physical practice.

(3) The learning of new conceptual knowledge by school learning.

(4) Rote memorization, such as attempting to learn lists of words or names.

(5) The learning of a narrative by watching a play, TV show, or movie, or listening to a story being told.

(6) The recall of episodic memories a person has experienced.

(7) The recall of conceptual knowledge by someone answering a question or being asked to explain something.

(8) Visual recognition, in which someone identifies some building, place or person.

Although psychologists and neuroscientists often talk about "encoding," there is no understanding of any brain process by which knowledge is translated into synapse states or neural states. So when neuroscientists talk about "encoding" they are really just using a jargon word meaning "memory acquisition" or "learning."

Let us look at whether there is any appreciable evidence of neural correlates for any of the eight activities listed above.

Conceptual Learning or Memorization

- The study "Sustained Mnemonic Response in the Human Middle Frontal Gyrus during On-Line Storage of Spatial Memoranda" found no difference of more than about 1 part in 200 between different brain areas during a memorization task.
- The study "Neural correlates of visual short-term memory for objects with material categories" found no difference of more than about 1 part in 200 between different brain areas during a memorization task.
- The study "Neural correlates of encoding emotional memories: a review of functional neuroimaging evidence" found no difference of more than about 1 part in 200 between different brain areas during a memorization task.
- The study "Whole-brain functional correlates of memory formation in mesial temporal lobe epilepsy" found no difference of more than about 1 part in 200 between different brain areas during memory formation.
- The study "State-related and item-related neural correlates of successful memory encoding" found no difference of more than about 1 part in 200 between different brain areas during memory formation.
- The study "The neural correlates of recognition memory for complex visual stimuli in the Medial Temporal Lobe" found no difference of more than about 1 part in 250 between different brain areas during "memory encoding activity for faces and scenes," and about 1 part in 1000 for "memory retrieval activity for faces and scenes."
- The paper "Neural correlates of multisensory perceptual learning" found no difference of more than about 1 part in 1000 between different brain areas

Memory Retrieval (Also Called Recollection)

- This brain scan study was entitled "Working Memory Retrieval: Contributions of the Left Prefrontal Cortex, the Left Posterior Parietal Cortex, and the Hippocampus." Figure 4 and Figure 5 of the study shows that none of the memory retrievals produced more than a .3 percent signal change, so they all involved signal changes of merely about 1 part in 333 or smaller .
- In this study, brain scans were done during recognition activities, looking for signs of increased brain activity in the hippocampus, a region of the brain often described as some center of brain memory involvement. But the percent signal change is never more than .2 percent, that is, never more than 1 part in 500.
- The paper here is entitled, "Functional-anatomic correlates of remembering and knowing." It shows a graph showing a percent signal change in the brain during memory retrieval that is no greater than .3 percent, less than 1 part in 300.
- The paper here is entitled "The neural correlates of specific versus general autobiographical memory construction and elaboration." It shows various graphs showing a percent signal change in the brain during memory retrieval that is no greater than .07 percent, less than 1 part in 1000.

- The paper here is entitled “Neural correlates of true memory, false memory, and deception." It shows various graphs showing a percent signal change during memory retrieval that is no greater than .4 percent, 1 part in 250.
- This paper did a review of 12 other brain scanning studies pertaining to the neural correlates of recollection. Figure 3 of the paper shows an average signal change for different parts of the brain of only about .4 percent, 1 part in 250.
- This paper was entitled “Neural correlates of emotional memories: a review of evidence from brain imaging studies.” We learn from Figure 2 that none of the percent signal changes were greater than .4 percent, 1 part in 250.
- This study was entitled “Sex Differences in the Neural Correlates of Specific and General Autobiographical Memory.” Figure 2 shows that none of the differences in brain activity (for men or women) involved a percent signal change of more than .3 percent or 1 part in 333.
- A 2012 review study on "neural correlates of emotional memories" is one that we might expect to have a higher chance of showing a notable correlation, given the possibility of the emotions showing up as signal changes in the brain images. But the story reports no signal changes of greater than about 1 part in 1000 anywhere in the brain.
- A brain scan study looked for neural correlates of "episodic retrieval success" during memory recall. The paper reports percent signal changes no greater than about 1 part in 500.
- The study "Encoding Processes During Retrieval Tasks" found no difference of more than about 1 part in 300 between different brain states during episodic memory retrieval.
- The study "Neural activity associated with episodic memory for emotional context" found no difference of more than about 1 part in 200 between different brain states during episodic memory retrieval.
- The paper "Parietal lobe contributions to episodic memory retrieval" found found no difference of more than about 1 part in 200 between different brain states during memory retrieval.
- The paper "Common and Unique Neural Activations in Autobiographical, Episodic, and Semantic Retrieval" found no difference of more than about 1 part in 200 between different brain states during memory retrieval.
- The paper "Functional-anatomic correlates of remembering and knowing" found no difference of more than about 1 part in 300 between different brain areas during memory retrieval.

Recognition Memory

- The year 2000 study "Dissociating State and Item Components of Recognition Memory Using fMRI" found no difference in brain signals of more than 1 part in 100, with almost all of the charted differences being only about 1 part in 500.
- The study "Remembrance of Odors Past: Human Olfactory Cortex in Cross-Modal Recognition Memory" found no difference in brain signals of more than 1 part in 200.

- The study "Neural correlates of auditory recognition under full and divided attention in younger and older adults" found no difference in brain signals of more than 1 part in 500.
- The study "Neural Correlates of True Memory, False Memory, and Deception" asked people to make a judgment of whether they recognized words, some of which they had been asked to study. The study found no difference in brain signals of more than about 1 part in 300.
- The study "The Neural Correlates of Recollection: Hippocampal Activation Declines as Episodic Memory Fades" was one in which "participants performed a recognition task at both a short (10-min) and long (1-week) study-test delay." The study found no difference in brain signals of more than about 1 part in 300.
- The study "The neural correlates of everyday recognition memory" found no difference in brain signals of more than about 1 part in 500.
- The study "Neural correlates of audio-visual object recognition: Effects of implicit spatial congruency" was one in which participants attempted a recognition task. The study found no difference in brain signals of more than about 1 part in 200.

We can summarize such results as follows: brains do not look any different and do not seem to act any different when a person is forming a new memory or recalling something previously learned or recognizing something previously encountered. Differences of merely 1 part in 200 can be best explained as random fluctuations, the type of tiny blips that occur all the time in bodily things such as heart rate and breathing rate. Such data is consistent with the idea that your brain is not the storage place of your memories, and that the formation and retrieval of memories is not a brain process. Also consistent with such an idea is the fact that no one has ever discovered a memory by examining brain tissue. No one has ever learned anything about a person's knowledge by examining the brain of a dead person. There is also no robust evidence for the storage of memories in animal brains. Claims to have detected memory storage spots in animal brains are junk science claims that do not hold up to critical scrutiny. Typically an examination of the study group sizes used in any such study will show a failure to use study group sizes adequate to produce robust evidence. Neuroscientists lack any credible theory of how human episodic and conceptual knowledge could be translated into brain states or synapse states. What we know about synapses and the dendritic spines they are attached to (such as the less-than-monthly lifetimes of the proteins in such things, and their constant random remodeling) conflicts dramatically with claims that synapses could be a storage place of memories that can last for decades.

Within the neuroscientist belief community that resembles a tribe or church, there is a pathological tradition under which signal variations of merely about 1 part in 200 are regarded as evidence for the brain being more actively engaged in some area. In no other field of biological study are variations so small regarded as good evidence. Let us imagine some scientist testing whether there is any truth to the common belief that your heart beats a little faster when you meet someone you are in love with. We can imagine a scientist hooking up heart rate monitors to young men, and analyzing the moments when young men met for a dinner date the female friends they were in love with. Now suppose the scientist found that the heart rate of such men only increased by 1 part in 200 at such meeting times (by an average of only about one third of a beat per minute). How would this result be reported? It would be reported as a null result. The paper would claim that it had debunked the common idea that your heart beats faster when you meet your true love, and would say that the 1 part in 200 discovered was no significant evidence for such an effect. Only in the community of neuroscientists are 1 part in 200 signal change effects claimed as substantial evidence. In all other fields of biology, such a difference would be dismissed as negligible.

Let's imagine you are a neuroscientist who does some experimental brain scanning study looking for a neural correlate of some memory activity. You fail to find any appreciable evidence for such a thing, finding no difference of more than 1 part in 200 in brain activity. Now, you have a choice. You can either honestly write up your paper as a null result, using a title such as "Failure to find a neural correlate of recollection." But you know that in your neuroscientist community the habit of researchers is to report 1 part in 200 variations as positive results. And you know that science journals have a very big publication bias, which is a strong tendency to prefer publishing papers reporting a positive result. So do you do the honest thing decreasing your chance of paper publication (one that will irritate your colleagues by defying their customary behavior), or do you "go with the herd" and report your result as a "neural correlate"? Given the "publish or perish" culture in academia (in which the number of papers you publish and the number of citations they get is regarded as all-important), you may feel irrestible pressure to just follow the dysfunctional convention, and report your negligible correlation finding as a "neural correlate."

You can get an idea of general conventions about correlation interpretation by doing a Google search for "guidlines for correlation interpretation." This will produce various papers like the one here, which give us interpretation guidelines such as this:

Size of correlation	Interpretation of correlation
.90 to 1.00	Very high correlation
.70 to .90	High correlation
.50 to .70	Moderate correlation
.30 to .50	Low correlation
.00 to .30	Negligible correlation

Clearly, following guidelines such as these, a percent signal change of only 1 part in 200 should be interpreted as a negligible correlation. Neuroscientists speak dishonestly when they try to pass off negligible results as being neural correlates of some kind of mind activity.

The ability of neuroscientists to find correlation false alarms is illustrated in a 2021 paper entitled "Neurons in the mouse brain correlate with cryptocurrency price: a cautionary tale." The paper tells us this, referring to financial instruments mice cannot possibly know anything about:

"Out of ~40.000 recorded single neurons, ~70% showed a significant correlation with Bitcoin or Ethereum prices. Even when using the conservative Bonferroni correction for multiple comparisons, ~35% of neurons showed a significant correlation, which is well above the expected false positive rate of 5%."

After reading such a paper, you may realize how the "1 part in 200" signal changes typically reported in neural correlate studies are no robust evidence that brains are worker harder when someone learns or remembers anything.

at October 02, 2022 No comments:

Labels: brain imaging, claims of neural correlates of mental activity

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Head Truth

The huge case for thinking minds do not come from brains

Sunday, September 25, 2022

TV Medical Dramas Give Us Wrong Ideas About Minds and Death

Very many people never bothered to study scientific matters after their most recent school studies. Such people may largely get their impressions about scientific matters from social media, news stories and fictional TV shows. This leads to incorrect ideas. News stories nowadays are filled with clickbait misleading hype, much of it coming from university press offices, which these days are notorious for their exaggerations and misstatements. And a person whose ideas about the human mind and body are largely coming from medical TV shows may often get the wrong idea.

I watched many episodes of the *New Amsterdam* medical drama series, and got a general impression of a hostility towards spirituality. One episode seemed to have an anti-Catholic tendency. Representatives of the pope were depicted as demanding a presidential suite in a hospital, just in case a visiting pope got sick. In the same episode, a son of a couple was depicted as telling his parents that they would go to hell if they got divorced.

In another episode of *New Amsterdam*, a patient having spiritual visions is revealed to have had such visions because of epilepsy. There is little or no evidence that epilepsy produces spiritual visions. People having full "grand mal" seizures (called tonic-clonic seizures) do not remember anything that occurred during the seizures. There are other types of seizures called (simple partial seizures and complex partial seizures) that a person can remember happening. Such seizures do not produce visions or complex hallucinations (such as seeing a deceased loved one).

It is sometimes claimed that temporal lobe epilepsy can produce mystical experiences. A scientific study had 86 patients with epilepsy fill out a questionnaire seeking evidence of mystical experience. The paper states, "none of the patients' descriptions met the criteria for mystical experience." The quote below from the paper discusses the gap between ivory tower teachings on this topic and observational reality:

"Religious experience, though sometimes seen in seizures, is not a common feature: prior studies among patients with epilepsy have cited frequencies of 1% (Kanemoto & Kawai, 1994) and 0.4% (Ogata & Miyakawa, 1998). Mystical experiences have been linked theoretically to the temporal lobes (Saver & Rabin, 1997), and that association has been widely accepted. According to Ramachandran and Blakeslee (1998, p. 1975), for example, 'every medical student is taught that patients with epileptic seizures originating in this part of the brain can have intense, spiritual experiences during the seizures.' However, a survey of patients in an epilepsy clinic found no mystical experiences (Sensky, 1983)."

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A much eariler 1990 survey of 234 epileptic patients said that only 1% of them reported something like a religious experience during a seizure. Referring to another larger study, the paper states, "According to Kanemoto et al's study, religious experiences have been recognized in six out of 606 temporal lobe epilepsy cases; an incidence of 1.0%." This is negligible evidence for epilepsy causing spiritual visions. A survey of spiritual experiences in non-epileptics would probably produce numbers as high.

Another fictional medical series is the long-running series *Grey's Anatomy,* which has run for 19 seasons. In Episode 7 of the first season, a doctor recommended a hemispherectomy for a child suffering from very bad seziures. Hemispherectomy involves surgical removal of half of the brain. The doctor assures the parents that the child would be able to live a relatively normal life after the operation. Indeed, the results discussed here suggest that removing half of the brain has little effect on the intelligence of children. But the explanation for this anomaly by the doctor was erroneous. The doctor stated, "The remaining neurons will compensate for the loss." Physically there is no evidence for any such compensating effect. The liver has a remarkable ability to grow new cells when damaged. The brain has no such ability. If someone has half of his brain removed in a hemispherectomy operation, the remaining neurons don't "compensate" by doubling themselves.

What happens here is extremely important to the topic of the relation between the mind and the brain. If removing half of his brain reduces someone's neurons by 50% without damaging his intelligence, that is strong evidence against claims that minds are made by brains. We should note we are being misinformed on this very important topic whenever any neuroscientist makes untrue claims about a remaining brain half "compensating" for the loss of the other brain half.

In one appalling part of the *Grey's Anatomy* show ("Can't Fight Biology," Season 7, Episode 4, 8:23 mark) a narrator incorrectly says, "Biology says that we are who we are from birth, that our DNA is set in stone." DNA (consisting of only low-level chemical information) does not make us who we are. DNA accounts for neither the anatomy of a human (which is not specified in DNA), nor the mind of a human, which is not explained by neurons. And even the structure of neurons is not specified by DNA, which does not specify how to build any of the roughly 200 types of cells in the human body.

At the 21:33 mark of Episode 13 of Season 11 of *Grey's Anatomy*, we have a doctor lecturing a hall filled with other doctors. The doctor gives us some phony baloney talk that no one should believe, stating this:

"Now arguably the most important part of the brain is the part that makes us hope, dream, imagine. One singular almost immeasurable part is what makes you you and me me and everyone everyone. It's technically called the fornix, but I call it the dream box."

Brains don't make you you or me me. No neuroscientist has any credible explanation of how dreams or hopes or imagination can arise from neural activity. When neuroscientists try to say something along these lines, they typically claim that thought comes from the cortex of the brain, located on the outer edges of the brain, not the fornix located in the center of the brain. The claim that thought comes from the cortex is not justified, for reasons discussed here.

The *Grey's Anatomy* show does rarely have some shows that sound as if they were written by someone who has studied paranormal phenomena. In Episode 8 of Season 1, there is a psychic who seems to have some clairvoyant knowledge of things he should not know, and his case is never explained away. In the "Some Kind of Miracle" episode in Season 3, there is a very good depiction of a near-death experience. With her heart stopped at the hospital as doctor's struggle to revive her, Meredith has a near-death experience in which she encounters a patient who previously died. She also encounters her mother. After going in one direction down a hall to hug her mother, she races back in the other direction. She then finds herself back at the hospital. She is then told her mother has died. Meredith acts as if she already knew this, having learned it through her near-death experience.

This "Some Kind of Miracle" episode was a fine depiction of a certain kind of near-death experience sometimes called a veridical near-death experience: one in which someone having the experience seems to observe or learn something he should have been unable to have learned or observed through normal means. You can find other examples in the post here. In this case Meredith seems to have learned something during her near-death experience that she did not yet know through normal means: that her mother was dead. Around episodes 3 and 4 of Season 17 Meredith had similar near-death experiences.

Near-death experiences often produce attitude changes in the person having them, but we saw not much of an attitude change in the Meredith character in episodes following the "Some Kind of Miracle" episode in Season 3. But not much later in the series we have what at first looks like a paranormal experience for one of the characters. In Season 4 we have the Izzie character start to repeatedly see and talk to an apparition of one of her patients (Denny), who she had romantic feelings for before he died. We get several episodes in which lengthy conversations occur between Izzie and the apparition of Denny.

Soon it turns out on the series that Izzie has a brain tumor. The series suggests that all of the appearances of Denny's apparition were just symptoms of a brain tumor Izzie had. In a Season 5 episode Denny says to Izzie, "I am you. I'm your tumor, you're talking to yourself." Izzie then has brain surgery to remove the tumor, and the appearnce of Denny's apparition no longer occur.

The idea that brain tumors can produce visual hallucinations of the dead (with matching auditory hallucinations) is unfounded fantasy. A review of the symptoms of 200 children with brain tumors finds no hallucinations other than two primitive "flashing light" hallucinations. It is very common for dying people to report seeing deceased love ones. Such occurrences are called deathbed visions. But there is no evidence that brain tumors are the cause of such visions, and they appear very frequently in the last days of people who do not have brain tumors.

Some examples of deathbed visions can be found here and here and here. A survey of family members of deceased Japanese found that 21% reported deathbed visions. A study of 103 subjects in India reports this: "Thirty of these dying persons displayed behavior consistent with deathbed visions-interacting or speaking with deceased relatives, mostly their dead parents." A study of 102 families in the Republic of Moldava found that "37 cases demonstrated classic features of deathbed visions--reports of seeing dead relatives or friends communicating to the dying person." In the classic work on deathbed visions (*At the Hour of Death* by Karlis Osis and Erlendur Haraldsson) we read on pages 71-72 that only about 12 percent of those having such visions died from diseases that can be associated with hallucinations.

There is a deplorable failure of fictional medical TV shows to depict this important aspect of human experience. We have all seen on doctor drama TV shows innumerable depictions of terminally ill patients in their last days or hours. But we never see the dying patient saying something like, "My goodness, doctor, there's my mother right there near the edge of my bed!" Why do TV medical dreams never show a depiction of such deathbed vision experiences when they happen so often?

There is a huge body of evidence suggesting that mental states can have very large effects on health outcomes in ways we cannot understand. Part of this evidence involves evidence for the power of the placebo effect, and another part of this evidence is data suggesting mental attitudes can greatly affect life expectancy. But on medical TV dramas we almost never hear about the importance of the mind in medical outcomes.

An extremely important point regarding the mind and the body is that the mere knowledge of negative medical information can have a very harmful effect on a patient. Tell a patient that he has some "ticking time bomb" medical issue, or tell him about some bodily issue that may inflict him years down the road, and the mere announcement of such a thing may be a kind of psychological torpedo blast causing incalculable damage to the person's state of mind, plunging him into some dark "world of worry" that may last for years. We almost never hear about such an important consideration in medical TV dramas. The idea is almost always "run ever test that might find trouble, and tell the patient about all the troubling results found."

On TV's doctor dramas the doctors are depicted pretty much as people with all the answers about biological questions. But doctors are no such things. They don't understand how a human is able to form a memory or how a human is able to retrieve a memory. And when a person becomes depressed, they typically don't understand why that happens.

Almost always on such shows a dying patient is depicted as terrified of dying. Almost always the dying patient is depicted as someone who wants for every measure to be taken to maximize his chance of living as long as possible. But many people who near the end of their lives are not afraid of death, and don't want to "pull out all the stops" to try to get every month out of a failing body. Many people are not afraid of death because of things they have learned and things they have experienced or seen with their own eyes which convinced them they are part of some spiritual reality never mentioned in medical textbooks. We almost never see such things depicted on TV doctor dramas.

A DNR order is an order that no attempt be made to use methods of resuscitation if a person's heart stops. Asking for a DNR order can be a quite reasonable choice for someone who is very old or in very poor health, such as someone with advanced cancer. Such a person may think in his state a cardiac resuscitation may be "buying himself months more of pain," and may prefer to let nature take its course, particularly if he believes in life after death. But typically in medical TV shows a person asking for a DNR is depicted as someone who doctors need to scold into changing his decision. Why can't our medical TV doctors respect a reasonable patient choice when it is made?

In the fictional world of TV medical dramas, cardiac resuscitation is depicted as being more prone to success than it is. A scientific paper tells us this:

"The public has unrealistic views regarding the success of cardiopulmonary resuscitation, and one potential source of misinformation is medical dramas.

- Why Brains Are Not Suitable for Storing Long Sequences Like Humans Remember
- Why Brain Scans Don't Show Brains Make Minds
- Why Strokes, Alzheimer's Disease and Drunkenness Don't Prove the “Brains Make Minds” Dogma
- Synaptic Density Studies Contradict the Most Popular Memory Theory
- The Rare "Total Recall" Effect That Conflicts with Brain Dogmas
- Physical Connections Do Nothing to Explain Cognition
- The Sociological Reasons Why Bad Explanations Persist in Academia
- Split-Brain Cases Conflict with "Brains Make Minds" Dogma
- Why So Much of Neuroscience News Is Unreliable
- An Analogy Clarifying Why the "Brain Stores All Your Memories" Dogma Is Untenable
- Why Darwinism Fails to Explain the Human Mind
- What Is It That a Brain Does?
- Cloud Computing and a Non-Local Model of Consciousness
- Why We Do Not Understand the Origin of Complex Biological Innovations
- Our Minds May Arrive Top-Down Not Bottom-Up
- Fancy New Technology Fails to Prove Memory Dogmas
- The Argument for Determinism Collapses Once We Discard the "Minds Come from Brains" Dogma
- Animal Experiments Conflicting with the Dogma That the Brain Stores All Memories
- Memory Recall Reality Versus the "We Can't Remember Well" Bunk of Professors
- Neuroscientists Keep Using Misleading Coloring in Brain Visuals
- Most Scientists Don't Follow Formal Evidence Standards, Unlike Judges
- Experimental Evidence for ESP Is Well-Replicated
- Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades
- NIH Bets $1,434,188 That Synapses Don't Store Memories
- A New Case of Very Large Brain Damage and Normal Mental Function
- When Clue-Blind Professors Ignore All the Signs

Prior research has shown that depictions of resuscitation on television are skewed towards younger patients with acute injuries, while most cardiac arrests occur in older patients as a result of medical comorbidities. Additionally, the success rate of televised resuscitations on older shows has vastly exceeded good outcomes in the real world....In this study, characters with medical causes of cardiac arrest were 4.6 times more likely to survive with good neurologic outcomes than patients in the real world while characters with traumatic cardiac arrest were nine times more likely. Medical dramas continue to misrepresent the demographics, etiologies, and outcomes of cardiac arrest."

Seizures are often inaccurately depicted on TV medical shows. A web page tells us this:

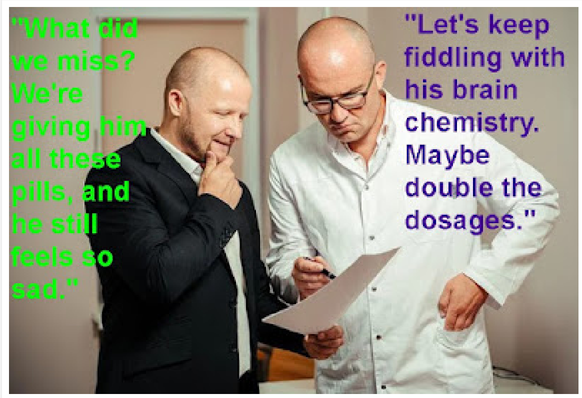
"In the name of science, researchers at Dalhousie University watched every episode of 'Grey's Anatomy,' 'House,' 'Private Practice' and the final five seasons of 'ER' — and they found that in those 327 episodes, 59 patients experienced a seizure. In those 59 cases, doctors and nurses incorrectly performed first aid treatments to seizing patients 46 percent of the time (including putting an object, such as a tongue depressor, in the seizing patient's mouth)."

In general in TV medical shows psychiatrists are depicted as people who understand how to fix whatever mental issues a patient has. We have endlessly repeated TV stories involving patients who have some mental problem, but who refuse to acknowledge that they need a psychiatrist. Virtually never do we have realistic depictions of the severe limitations, explanatory failures and uncertainties of psychiatry. It's almost always a story line of "just find out the problem, and get the guy to take the right pills or have the right operation." The truth is that psychiatrists have for the past thirty years "bet the farm" on brain chemistry theories of mental disease, theories that have been a spectacular failure.

In a Wired interview a former director of the National Institute for Mental Health (Tom Insel) made this confession: "I spent 13 years at NIMH really pushing on the neuroscience and genetics of mental disorders, and when I look back on that I realize that while I think I succeeded at getting lots of really cool papers published by cool scientists at fairly large costs---I think $20 billion---I don't think we moved the needle in reducing suicide, reducing hospitalizations, improving recovery for the tens of millions of people who have mental illness."

Talking about changes in the brain, a professor of psychiatry Kingdon states this: "No such clear causative changes exist in severe mental illnesses such as depression, anxiety, bipolar disorder and schizophrenia." After noting "25 years of research frustration," Kingdon quotes a neuroscientist who advocates that we keep at this not-getting-much-of-anywhere research approach. Kingdon then states this:

"But does this not seem, after more than 30 years of failure, more akin to a religious or, albeit culturally influenced, persistent strong belief than one based on scientific grounds? Just where is the rational justification for ploughing the same furrow again and again?"



We may wonder: how much better results would psychiatrists get if they followed a strategy not of "fiddle with their brain chemistry" but instead "try to heal their souls?"

Postscript: It is reported in the science news today (September 29) that those taking pills to fight depression are subject to much higher rates of heart disease. We read this:

"People taking antidepressants were compared with those not on the drugs. Following up after 10 years, those on SSRIs had a 34 per cent increased risk of heart disease, an almost doubled risk of cardiovascular death. They also had a 73 per cent higher chance of death from any cause. For the other antidepressants, all the risks were around double."

Is this greater risk caused by the pills, or by the depression itself? The people cited in the article sound like they don't know. We are given the impression of psychiatrists messing around with people's brains, without understanding whether there are deadly effects of the pills they are prescribing.

Of course, we never ever hear about such uncertainties on medical TV shows. You'll never hear a TV doctor say, "I prescribed him some pill, but I don't know whether it will help cure him or help kill him."

At this page we read of a psychiatry professor who has been trying to stop using SSRIs, through a very gradual reduction lasting years. We get the impression of some great hazard in suddenly stopping their use. But in the TV shows we never hear a psychiatrist say, "I'm going to put you on this pill, but it's pretty addictive."

at September 25, 2022 No comments:

Labels: psychiatry

Sunday, September 18, 2022

For Insight About Your Brain and Mind, Ponder the Never-Founds

Let us imagine an extraterrestrial planet named Covossca where science and technology are very advanced. The scientists know all about their bodies, except for what is inside their skulls. We can imagine that a social restriction prevented scientists on Covossca from ever studying what is inside the skulls of organisms such as themselves. We can imagine that on planet Covossca an all-powerful church in charge of everything prevented all scientists from ever opening up a skull, on the grounds that skulls contained a sacred soul that it was blasphemy to disturb. So the scientists on Covossca knew all about the exact details of their bodily organs underneath their necks, but knew nothing at all about what was inside their skulls.

Let us imagine that upon getting tired of endless pleas from scientists and doctors to allow the examination of the contents of skulls, the all-powerful church finally relented, and finally gave permission for the scientists to examine what was in the skulls of newly deceased people. After such permission was granted, there might be a conversation like this between two scientists:

Aldorus: *This is fantastic! We're finally going to get to study what is inside the skull. What types of things will we find?*

Beyonus: *We will find all of the secrets of mind and memory inside the skull, of course.*

Aldorus: *How can you know that?*

Beyonus: *Where else could they be, but inside the skull? We haven't found them anywhere else in the body.*

Aldorus: *So what type of things should we expect to find? What type of things should we be looking for?*

Beyonus: *We can expect to find memories. When you open the skull of a dead person, you will find all the knowledge he ever learned, and his memories of all the important experiences he had.*

Aldorus: *How will those look when we see them?*

Beyonus: *Maybe they will be tiny little pictures that we will be able to see when examining the matter inside the skull with sufficient magnification. Or maybe there will be tiny text we can read. Or maybe the information will be encoded. In that case it may take quite a while the crack the code. But at least we can be sure we have discovered encoded information as soon as we see it.*

Aldorus: *Why is that?*

Beyonus: *Because when information is encoded, there is always a great repetition of a small number of tokens. It's like the letters of an alphabet. The same limited set of letters keeps being repeated over and over again. Whenever you find something like that, you know you have found encoded information.*

Aldorus: *What other things should we expect to find?*

Beyonus: *We should expect to find sorting, addressing and indexing. If such things didn't exist inside the skull, we couldn't be able to remember things so quickly. You name some person from history, and I can instantly tell you all about him. That can only occur if there is sorting, addressing and indexing inside the skull which can allow exactly the right information to be found so fast.*

Aldorus: *Should we expect to find some kind of little widget that reads the right memory?*

Beyonus: *No doubt! There must be some kind of little thing inside the skull that reads the memories stored there. Maybe like some tiny roving eyeball.*

Were True

- "Brains Make Minds" Models All Flunk a Large Brain Scan Study
- The Philosophy of Teleospiritism
- The Biggest Blunders of Theories Such as Integrated Information Theory
- Study Finds No Robust Link Between Brain Structure and Personality
- The Two Huge Mistakes Involved in Typical Talk of a "Hard Problem of Consciousness"
- Neuroscientists Keep Wrongly Assuming the Source of Something Must Be Near Its Observed Manifestations
- The Vague Unfounded Boasts of Biology Sound Like the Vague Unfounded Boasts of Astrophysics
- 8 Reasons for Doubting Claims of the Heritability of Intelligence
- Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"
- Exhibit A Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- Exhibit B Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- More Indications Scientists Don't Understand How a Brain Could Think or Remember
- Studies New and Old Fail to Show a Big Link Between Brain States and Minds

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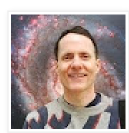

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March 2023 (2)

Plus there must be some kind of little thing that writes memories, or how else could memories be stored. Maybe it will kind of like a little moving pencil.

Aldorus: *But will a man's memories fade between the time he dies and the time we open his skull?*

Beyonus: *Not at all. People like us can remember what we learned decades ago. So we'll find some stable writing surface where memories persist for decades, like writing chiseled into stone.*

Now, let us imagine that the scientists on planet Covossca finally were given permission to open up some skulls of people who recently died. Imagine if they were shocked to find that inside the skulls of everyone they checked, there was nothing at all except a heap of *very fine powder,* something like the heap shown below:

Would the scientists of Covossca modify their opinions in an appropriate way after such a discovery? They might. But it is as likely as not that they would just cling to the dogmas they had long taught, unswayed by the facts they had discovered. We can imagine a conversation like this:

Aldorus: *So now we've finally found what is inside skulls, and it's nothing but a disorganized powder! We must have been all wrong about memories being stored in skulls, and minds coming from inside the skull.*

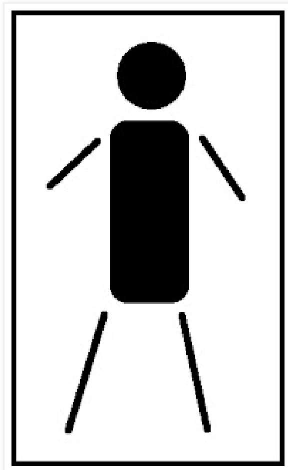
Beyonus: *No, no! We just need to study the tiny powder specks more carefully! Maybe there is something about these tiny powder specks that causes them to produce the fruits of our minds: thinking and insight and self-hood and imagination. Maybe there is something very special about the way the tiny powder specks are arranged, that allows them to store memories, and makes possible the instant retrieval of memories.*

What has occurred on planet Earth is actually very similar to what occurred in this story about the planet Covossca. Earth scientists have examined very carefully what is inside skulls. They didn't find mere powder. But they did find inside skulls something just as discouraging to all claims that brains store memories and make minds: just a lump of meat with the consistency of jello.

We should ponder very carefully all of the "never-founds" of the brain. These are things that we either should expect or might expect to be found in the brain if it is the storage place of memories, but which never have been found in the brain.

Never-Found #1: Tiny Images in Brains

One way you can imagine memory being stored in brains is by the preservation of tiny images. We can imagine a brain taking periodic "snapshots" of what you see, and then saving such "snapshots." No such thing has ever been found in a brain. No one has ever found anything like photos. No one has ever found anything even as crude as a few dots representing a shape seen. For example, no one has even found in a brain an image as crude as the one below:

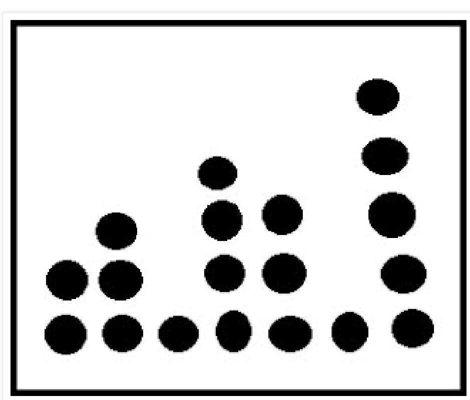


Never-Found #2: Tiny Text in Brains

Another way we can imagine memory being stored is by a writing of tiny text. For example, you can imagine someone looking at some brain tissue in an electron microscope, and finding tiny little letters smaller than cells. No such thing has ever been found.

Never-Found #3: Tiny Numbers in Brains

Another way we can imagine memory being stored is by a writing of tiny numbers. For example, you can imagine someone looking at some brain tissue in an electron microscope, and finding tiny little numbers smaller than cells. Such things might exist as numbers such as 83922. Or they could exist through some dot-symbol representation. For example, we can imagine someone looking through an electron microscope to see something like this in the brain, which could be a neural storage of the telephone number 231-4315:

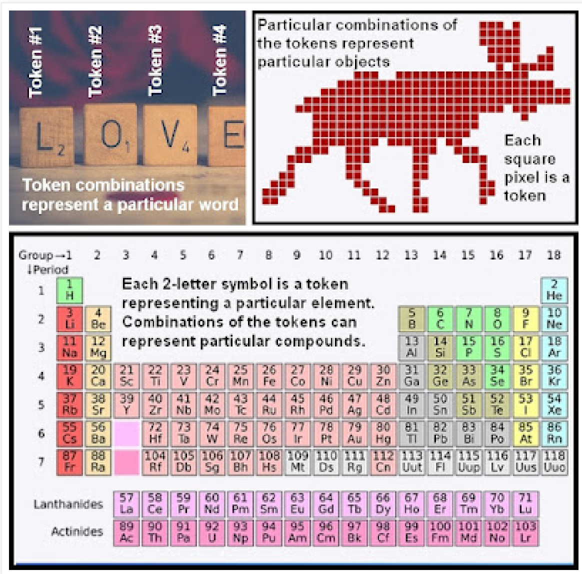


No such thing has ever been found in the brain. No one has ever found anything like a neural storage of learned numbers.

Never-Found #4: Non-genetic Token Repetition in Brains

Labels

Tokens are used in a repetitive manner when information is stored. In digital storage systems the tokens are electronic marks that are the equivalent of 1 and 0. In books the repeated tokens are letters. In photos the repeated tokens are pixels, tiny dots of color. There are many possible ways to represent things, using different systems of tokens.



The only token repetition ever discovered in brains is the token repetition occurring in DNA, found in almost all cells in the body. That is genetic token repetition, in which (following the coding scheme of the genetic code) certain combinations of nucleotide base pairs represent particular amino acids.

Except for this genetic token repetition which occurs in almost all cells (such as cells in the fingers and the feet), no token repetition has ever been discovered in the brain. The importance of this cannot be underestimated. It suggests very strongly that learned information is not stored in the brain.

There are all kinds of "secret codes" that we can imagine a brain using to store information. But such codes all require massive amounts of token repetition. For example, the Morse Code is a way to transmit information by using a series of dots and dashes. The Morse Code can also be used to store information. But whenever such a code is used, there is always massive amounts of token repetition. For example, three dots means "S" in the Morse Code, and three dashes means "O" in the Morse Code. When you cannot find any token repetition despite the most careful examination, you can be pretty sure information is not being stored.

Never-Found #5: Addressing in Brains

Addressing is some system whereby unique spatial positions have unique identifiers. We are all familiar with one type of addressing: the unique addresses of houses in a city. Addressing is also used in books, where each page has a unique address (its page number). Addressing is also used by the Internet. The URL of a web page is a unique address allowing browsers to quickly find one particular page among all the pages of the internet. Addressing is also used on digital devices such as smartphones and computers. On my computer a file name combined with a full path name makes up a unique address for a file. For example, on my computer a particular file has the unique address of c:\windows\write.exe.

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

No one has ever discovered any type of addressing system used by the brain to identify particular cells or synapses. Neurons do not have neuron numbers or neuron names or neuron addresses, and synapses do not have synapse numbers, synapse names or synapse addresses. This is troubling, because it means that although humans are able to retrieve obscure little-remembered information instantly, the brain does not use one of the three things that enable rapid information of physically stored information: addressing, sorting and indexing. But what about the other two? They are discussed next.

Never-Found #6: Sorting in Brains

Sorting is something that can help allow fast information retrieval. An example is found in books. Books have unique page numbers, but you would not be able to use the index of the book to find information quickly if the pages of the book were not sorted in numerical order. Another type of sorting that facilitates fast information retrieval is alphabetical sorting. An example of such sorting can be found in a one-volume encyclopedia. It is easy to find information quickly on any topic, because there is an alphabetical sorting of the articles. Similarly, if you have a large file cabinet filled with 100 or more manilla folders, you can find some desired information quickly if the folders are arranged in alphabetical order.

No one has ever discovered any type of physical sorting in a brain. The physical arrangement of the brain makes a sorting of neurons impossible and a sorting of synapses impossible. Once a neuron exists, it is attached to so many synapses that it cannot move around in the brain. Synapses are also stuck in their current position, and cannot move or be moved around in any way that would allow sorting. In this sense both neurons and synapses differ from blood cells, which can move around from place to place in the body.

Never-Found #7: Indexing in Brains

Indexing is something that can facilitate the fast retrieval of information. Indexing is used at the back of books. Indexing is also a crucial part of database systems that allow a fast retrieval of information. For indexing to be used effectively, a system must have both addressing and sorting. For example, you can index a book to allow fast retrieval of subject matter, but the book must have page numbers, and the page numbers must be in numerical order.

There is no sign of any indexing in the brain. This should as no surprise, given that effective indexing requires both sorting and addressing, neither of which exist in the brain.

Never-Found #8: A Place in the Brain for Permanently Storing Memories for Decades

For information to be permanently stored, there must be a stable medium to write to, a place where writing can last for many years. Some of the earliest stable media to write to were clay (used in writing cuneiform), parchment, and paper. Nowadays computers use a stable medium such as magnetic disks.

Does the brain have anything like this – some medium allowing a permanent, stable storage of information? It would seem not, at least nothing that could be used by the brain to store memories that last for many years. The main assumption about neural memory storage during the past decades has been that memories are stored in synapses. But synapses are an unstable "shifting sands" type of medium subject to high molecular turnover and structural turnover. Rapid molecular turnover and structural turnover in synapses should make

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

them unsuitable for storing memories that last longer than a year. But humans are able to remember many memories for 50 years or longer.

You could in theory use DNA as a permanent storage mechanism, given some fantastically complicated and never-discovered system for translating human conceptual information and episodic memories into the nucleotide base pairs that make up DNA. But DNA has been exhaustively studied by multi-year highly-funded projects such as the Human Genome Project and the ENCODE project, and no one has ever found any learned knowledge or episodic memories in DNA. We know what kind of information is in DNA (low-level chemical information), and it isn't human memory information.

Never-Found #9: A Position Focus Mechanism in the Brain

When we consider all of the different ways in which information is retrieved from a physical location, we find there is a common characteristic. Almost always there is some mechanism of position focus. Position focus occurs when some particular part of the information is highlighted as kind of “the current position” within that information.

I can some give examples of this kind of “current position” effect:

1. A physical book can be opened to only one pair of pages. When a reader reads that book, his eyes can focus on only one line at a time. When the reader focuses on a particular line, position focus is achieved.
2. When a film is run through a film projector, only one frame at a time can be in front of the light that passes through the film. In such a way, position focus is achieved.
3. In the disk of a computer hard-drive, there is a read-write head that moves around to read particular parts of the disk. At any time, the head is above one particular spot of the disk, and position focus is achieved.
4. The needle of a phonograph can only be resting on on one little spot on the phonograph record. Whenever that needle rests on one particular spot on the record, position focus is achieved.
5. The current tab of a web browser will always be on one particular web page, with a URL displayed at the top of that tab. With such a rule, position focus is achieved, with the URL being a particular position within the vastness of the Internet.

Position focus requires moving parts. For example, the pages of a book move, the eyes move as you read, a phonograph record spins, a movie projector moves the film continuously, and a read-write head moves about on a hard disk. But there is no macroscopic part of the brain that moves about when you retrieve a memory. Other than chemicals and electricity and blood, which are constantly flowing about in the brain, there is no movement that goes on in the brain when you retrieve a memory. It would seem, therefore, that there is no possible way in which a brain could achieve any type of position focus that would be necessary for it read from one particular spot to retrieve one and only one memory.

Never-Found #10: A Writing Component in the Brain

In the brain there is nothing that bears any resemblance to a writing component. There is no special molecule or special cell that moves around to some particular writing spot, to dump information at that spot, like a pencil writing on a piece of paper. There is no little moving widget or cellular gizmo in the brain that moves around in the brain to dump information at some particular spot, like some little moving laser that can make marks at some particular place.

Never-Found #11: A Reading Component in the Brain

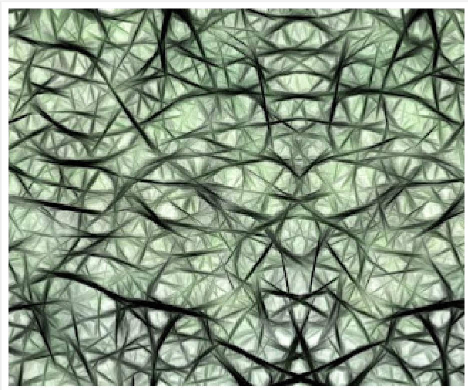
In the brain there is nothing that bears any resemblance to a reading component. Neurons or synapses are static, and do not move around in response to memory retrieval. If a reading component were to exist in a brain, for the sake of retrieving memories, it would have to be some mobile component or gizmo that could move around from one brain spot to another. There is no sign of any such thing in the brain. When the brains of people retrieving memories are scanned, scans reveal no sign at all of any component moving around to read memories or do anything else. Other than chemicals and blood cells that move around, brains do not have moving components.

Never-Found #12: High Levels of Cellular or Synaptic Organization in Brains

The knowledge in a person's mind is highly organized, often with a hierarchical kind of structure. For example, consider this:

- You can name a variety of planets, such as Earth, Venus and Mars.
- Pondering one of those planets (Earth), you can name a variety of continents existing on that planet.
- Pondering one of those continents, you can name a variety of countries on that continent.
- Pondering one of those countries (the United States), you might be able to name a variety of the 50 states that make up that country.
- Considering one of those 50 states (New York state), you might be able to name particular cities in that state (such as Albany and New York City).
- Thinking of New York City, you might be able to name the five boroughs of that city.
- Pondering one of those five boroughs (Manhattan), you might be able to name a variety of streets in that borough.
- Pondering one of those streets (such as Broadway), you might be able to name a variety of buildings on the selected street.
- Pondering one of those buildings (such as a particular Broadway theater), you might be able to name actors that are starring in some play now running in such a building.
- Pondering such an actor, you will be able to name particular parts of his body such as legs, brain, heart, pancreas, kidneys, arms and so forth.
- Pondering one of those parts of the body (such as an eye), you might be able to name particular parts that make up that part, such as the lens, retina and cornea that make up an eye.

So the knowledge in a mind can be very highly organized. Is there any evidence of structural organization in a brain that correpsonds to such high levels of organization in human minds? Not really. Cells are very organized things. But the billions of neurons in your brain do not exist in any very organized structure. And synapses have no impressive organization that anyone can detect. The matter in the brain does not seem to be any more organized than the matter in your buttocks. Examining the arrangement of neurons and synapses in the brain, no one sees some very impressive organization that causes him to say this: "Now this MUST be where memories are stored -- it's all so *organized*!" Brain tissue looks rather like the visual below, which is something no more organized than a pot of wet pasta:



Never-Found #13: Synapses That Reliably Transmit Signals

Humans can remember things with astonishing accuracy. For example, when an actor plays the role of Hamlet, he accurately repeats about 1480 lines. But synapses do not transmit signals reliably. A paper tells us, "Several recent studies have documented the unreliability of central nervous system synapses: typically, a postsynaptic response is produced less than half of the time when a presynaptic nerve impulse arrives at a synapse." Another scientific paper says, "In the cortex, individual synapses seem to be extremely unreliable: the probability of transmitter release in response to a single action potential can be as low as 0.1 or lower." The idea that memory information is being passed around in your brain is therefore inconsistent with what we know about synapses. For some memory information to travel from one part of the brain to another part of the brain only a few millimeters away, the information would have to pass through very many synapses. With a low chance of success during each transmission of the signal across a synapse, you would never be able to remember anything accurately if your memory recall depended on synaptic transmission.

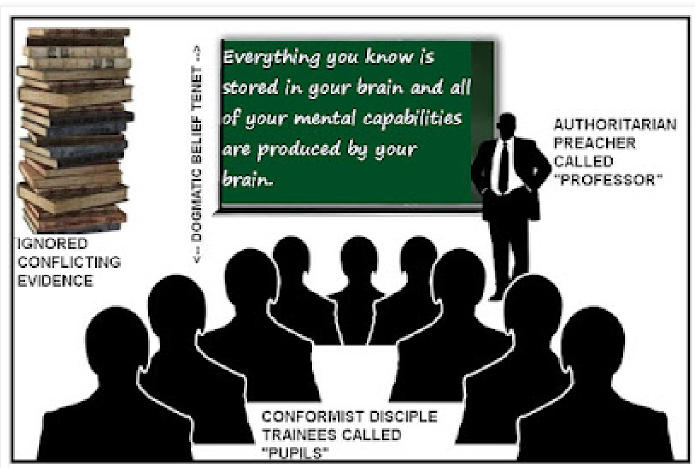
Never-Found #14: A Readable Memory in a Dead Person's Brain

If memories were stored in human brains, there would have to be some setup allowing memories to be preserved for decades. In such a case it would be possible to read a memory from a dead man, by opening up someone's skull just after he died, extracting some tissue, and studying it with a microscope. No one has ever read any type of memory from a dead person. You can read the DNA of a dead person, extracting all kinds of information about the person's genes. But it is impossible to ever find anything about what a person learned or thought by studying his brain after he died.

Scientists have no reasonable prospect of ever being able to read a memory from a dead person. This is shown by the fact that no attempt is being made to preserve the brains of dead people in hopes of learning information about something they did, thought or learned. There are not even currently funded research projects in which scientists are experimenting with trying to read memories from dead people. There are some rich people who have paid to have their brains frozen when they die. But you never hear scientists saying something like, "Let us freeze the brain of that president when he dies, because we might find some memories that help us understand history better."

What These Never-Founds Suggest

Collectively the never-founds above discussed above suggest that your brain is not the storage place of your memories. But neuroscientists tell us differently. Do their opinions derive from facts they have discovered about the brain? No. Their opinions derive from speech customs of the belief community neuroscientists belong to. Neuroscientists never independently reached the conclusions they teach about brains and minds. Such conclusions are beliefs they were taught when they trained to be neuroscientists. It was made very clear during such training that such beliefs are sacred cows that must not be challenged, part of a belief tradition that must be parroted for someone to move down the neuroscientist career path. The education of such neuroscientists did not include reading any of 1000 important volumes with evidence conflicting with such dogmas, such as books filled with accounts of people floating out of their bodies and viewing them from above. Like religious seminaries yielding identical-speaking dogmatic disciples, the neuroscientist graduate programs churn out conformist disciples who believe the same. It's kind of like some pastry chef using a cookie cutter to churn out identical-looking cookies.



The interesting Netflix series "100 Humans" repeats some of the most groundless dogmas of neuroscientists, but at one point the show teaches us about the kind of herd behavior going on in neuroscientist belief communities. Early in Episode 8, we see 100 humans outside, 97 of whom have been told to smash a pie in their face after doing a dance. Three other humans are the test subjects. All 100 are holding cream pies. The 97 do the same dance they have been taught, and the 3 test subjects imitate that dance. Then the 97 all smash their cream pies into their faces, despite no one telling them to do that (merely 3 leaders giving a gesture suggesting such an action). Two out of the three test subjects also smash their cream pies into their faces, even though no one verbally commanded them to do so. The results are not surprising. People will say unwise things and do unwise things and make unwarranted claims, just to fit into some group they are part of.

at September 18, 2022 No comments:

Labels: brain shortfalls

Sunday, September 11, 2022

Some of the Weak Papers Neuroscientists Cite As Evidence for Their Chief Claims

An extremely common phenomenon in science papers is the practice of faulty citations. It commonly works like this:

- A scientific paper will claim that some dubious assertion is "well-established" or supported by "overwhelming evidence," immediately following such claims by citations.
- A very careful examination of the papers discussed will find either that the authors of the papers did not make the assertion, or that the papers were poorly-designed studies that failed to provide robust evidence to back up the assertion.

Let us look at some examples of such faulty citations. The paper "Learning causes synaptogenesis, whereas motor activity causes angiogenesis, in cerebellar cortex of adult rats" has been cited 1490 times in the neuroscience literature. That's very strange, because the paper describes a poorly designed experiment guilty of quite a few Questionable Research Practices. The paper tells us it used 38 rats in four study groups, stating: "Thirty-eight adult Long-Evans hooded female rats, kept in small groups until 10 months old, were housed individually for 30 days in one of four experimental groups." We are also told that five of the rats had to be "dropped out." This means there were fewer than 10 animals per study group. In experimental studies 15 subjects per study group is the minimum for a modestly reliable experimental result. The authors could have found out that they were using way too few subjects if they had followed good experimental practice by doing a sample size calculation, but they failed to do such a calculation.

The authors also made a very bad violation of good scientific practice by failing to tell us the exact number of subjects in each study group. We see some graph comparing the study groups, and one of the graphs shows one of the study groups (one that did learning) having more "Synapses per Purkinje cell" (although not a higher synaptic density). But exactly how many rats were in this study group? Was it 9, 5, or only 2? We have no idea, because the authors did not tell us how many research subjects (how many rats) were in each of the study groups. This is a glaring violation of good scientific practices. Also, the study fails to follow a blinding protocol. The scientists measuring the synapse numbers should have been blind to which study group the animals were in, but they apparently were not. For such reasons, this study provides zero robust evidence to support the claim in its title that learning causes synaptogenesis (the formation of new synapses).

Let us look at another paper that has been cited more than 4000 times by neuroscientists. The paper is "The Molecular Biology of Memory Storage: A Dialogue Between Genes and Synapses" by Eric R. Kandel. This is not an experimental paper, but a review article. There are red flags near the beginning. The author writes in an autobiographical way, as if he was telling his life story. That is not the standard way in which a scientific review article is written. A review article is supposed to be a dispassionate examination of evidence, without wading into personal matters such as the author's life quest. The article contains 39 uses of "I" and countless other uses of "we." For example, we read, "A decade ago, when I reached my 60th birthday, I gathered up my courage and returned to the hippocampus."

There are some diagrams, but none of them are supported by specific numbers mentioning the exact size of any study group or the number of research subjects used. There are no specific mentions of exact research results that mention how many subjects were researched. This is the exact opposite of how a good scientific review article should be written. A good scientific review should let us know exactly how many subjects were used in all of the experiments it is citing. The article is littered with groundless achievement legends, unsupported claims that some researcher showed X, Y or Z without any specific numerical evidence showing that any such thing was shown. Near the end of the article, the author asks so many questions that it is clear that the title of the paper is inappropriate, and that there is no such thing as a known "molecular biology of memory storage."

What we have here is mainly an autobiographical essay that fails to meet the standards of a good scientific review article. But this essay has been cited more than 4000 times by researchers, just as if were a regular scientific paper.

Another highly cited neuroscience paper is the paper "A specific amyloid-β protein assembly in the brain impairs memory," which has been cited more than 2000 times. A long article in the leading journal Science claims that this paper and some similar papers may have "signs of fabrication." Below is a quote from that article about the protein described in the paper:

*'Given those findings, the scarcity of independent confirmation of the Aβ*56 claims seems telling, Selkoe says. 'In science, once you publish your data, if it's not readily replicated, then there is real concern that it's not correct or true. There's precious little clearcut evidence that Aβ*56 exists, or if it exists, correlates in a reproducible fashion with features of Alzheimer's—even in animal models.' "*

Another highly cited neuroscience paper is "The Fusiform Face Area: A Module in Human Extrastriate Cortex Specialized for Face Perception." The paper (which has been cited more than 8000 times) claims to find higher signal activation in some tiny part of the brain when subjects were shown faces. At first glance Figure 3 of the paper looks a little impressive. We see a graph showing observations of faces involving about a 2% signal change, compared to 18 observations of non-faces involving only about a 1% signal change. Unfortunately the number of subjects used to produce these graphs was too small for a reliable result to be claimed -- only six subjects. Also, the paper makes no mention of any blinding protocol. So the people estimating the signal changes apparently knew whether a face had been observed or not, which could have biased their estimations. A paper like this should not be taken seriously unless the paper mentions how a blinding protocol was followed.

The paper "Place navigation impaired in rats with hippocampal lesions" has been cited more than 7000 times. The paper did not deserve such citation, because it failed to follow good research practices. The study group sizes were too small. The study group sizes consisted of 10, 13, 4 and 4 subjects. Each of the study group sizes should have been at least 15 for a somewhat persuasive result. It is very easy to get false alarm results using study group sizes smaller than 15.

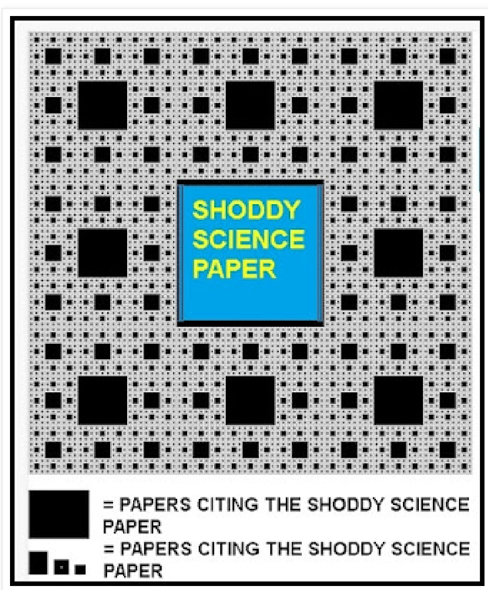
The 2002 review article "Control of goal-directed and stimulus-driven attention in the brain" has been cited 12,792 times. Such a level of citation is very strange, because the article provides no strong evidence of neural correlates of goal-directed attention. The paper makes use of the very misleading visual representation technique so favored by neuroscientists, in which regions of the brain showing very slightly greater activation (such as 1 part in 200 or 1 part in 500) are shown in bright red or bright yellow, with all other brain regions looking grey. Such visuals tend to create the idea of a much higher activation difference than the data actually indicates.

A very misleading part of the article is Figure 3. We see a line graph in which the left side is labeled "fMRI signal," and we see variations from "0.05" to ".25," which a reader will typically interpret as being a 500% variation. The authors forgot to label this as a mere "percent signal change" variation. Instead of it being a 500% signal variation, it is a mere variation between .0005 and .0025, a fluctuation of less than 1 part in 300. Tracking down the source paper cited ("Neural systems for visual orienting and their relationships to spatial working memory," Figure 3), shows the correct labeling that used "percent signal change" to show that the reported variation was extremely slight. Why has a very slight variation been visually represented (in the "Control of goal-directed and stimulus-driven attention in the brain" paper) to make it look like some huge variation?

The 1998 paper "Neurogenesis in the adult human hippocampus" has got more than 8000 citations, according to Google Scholar. But a 2019 paper says this about adult neurogenesis (the formation of new neurons):

"Here we examine the evidence for adult human neurogenesis and note important limitations of the methodologies used to study it. A balanced review of the literature and evaluation of the data indicate that adult neurogenesis in human brain is improbable. In fact, in several high quality recent studies in adult human brain, unlike in adult brains of other species, neurogenesis was not detectable."

A year 2022 paper had a title of "Mounting evidence suggests human adult neurogenesis is unlikely."



Recently the interesting web site www.madinamerica.com (which specializes in a critique of psychiatry dogmas) had a post that mentioned an interesting case of a weak neuroscience paper that got very many citations:

"A highly publicized MD-candidate-gene link was put forward in a widely cited 2003 study by Avshalom Caspi and colleagues (according to Google Scholar, cited over 10,400 times as of August, 2022, or about 550 citations per year over 19 years), who concluded that people experiencing 'stressful

life events' are more likely to be diagnosed with depression if they carried 5-HTTLPR, a variant genetic sequence within the SLC6A4 gene that encodes a protein that transports serotonin within neuronal cells. For many people, the Caspi study provided a sensible explanation for the causes of depression, where life events and genetic predisposition combined to explain why some people become depressed, while others do not. However, despite the publication of at least 450 research papers about this genetic variant, by 2018 or so it was clear that the 5-HTTLPR depression theory did not hold up. The rise and fall of the 5-HTTLPR-depression link was described in psychiatric drug researcher Derek Lowe's aptly-titled 2019 Science article, "There Is No 'Depression Gene.'" The depression candidate gene literature, he wrote, turned out to be 'all noise, all false positives, all junk.' "

A psychiatrist commented on the mythology of 5-HTTLPR that arose:

"First, what bothers me isn't just that people said 5-HTTLPR mattered and it didn't. It's that we built whole imaginary edifices, whole castles in the air on top of this idea of 5-HTTLPR mattering. We 'figured out' how 5-HTTLPR exerted its effects, what parts of the brain it was active in, what sorts of things it interacted with, how its effects were enhanced or suppressed by the effects of other imaginary depression genes. This isn't just an explorer coming back from the Orient and claiming there are unicorns there. It's the explorer describing the life cycle of unicorns, what unicorns eat, all the different subspecies of unicorn, which cuts of unicorn meat are tastiest, and a blow-by-blow account of a wrestling match between unicorns and Bigfoot."

A 2018 paper analyzing more than 1000 highly cited brain imaging papers found that they had a median sample size of only 12. In general, experimental studies that use study group sizes so small do not provide reliable evidence for anything. Study group sizes of at least 15 are needed for even a modestly persuasive result.

There is a standard way for a scientist to determine whether the study group sizes used in an experiment are sufficient to provide adequate statistical power. That way is to do what is called a sample size calculation (also called a power calculation or statistical power calculation). The 2018 paper mentioned above found that "only 4 of 131 papers in 2017 and 5 of 142 papers in 2018 had pre-study power calculations, most for single t-tests and correlations." This is a dismal finding suggesting that poor research habits in experimental neuroscience are more the rule than the exception.

Besides a massive level of citation of weak and shoddy papers and papers describing studies using Questionable Research Practices, a gigantic problem in neuroscience literature is faulty citation. This is when a paper makes some statement, and includes a reference to some other paper to back up its claim. Very often when you track down the cited papers you will find that they did not make the claim being made in the paper making the citation, or failed to provide any robust evidence for such a claim. For example, you may see some science paper have a line like this:

"Research shows that Moravians are more likely to suffer memory problems.[17]"

But when you track down Reference # 17 listed at the end of the paper, you may find some paper that either does not make any such claim, or provides some research that comes nowhere close to showing such a claim.

A scientific paper entitled "Quotation errors in general science journals" tried to figure out how common such misleading citations are in science papers. It found that such erroneous citations are not at all rare. Examining 250 randomly selected citations, the paper found an error rate of 25%. We read the following:

"Throughout all the journals, 75% of the citations were Fully Substantiated. The remaining 25% of the citations contained errors. The least common type of error was Partial Substantiation, making up 14.5% of all errors. Citations that were completely Unsubstantiated made up a more substantial 33.9% of the total errors. However, most of the errors fell into the Impossible to Substantiate category."

When we multiply the 25% figure by 33.9%, we find that according to the study, 8% of citations in science papers are completely unsubstantiated. That is a stunning degree of error. We would perhaps expect such an error rate from careless high-school students, but not from careful scientists.

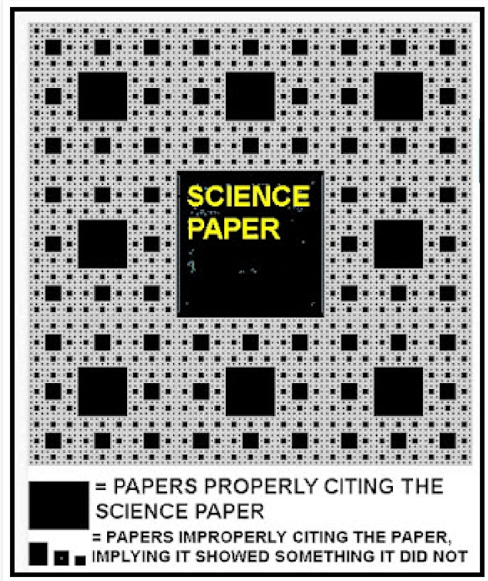
This 25% citation error rate found by the study is consistent with other studies on this topic. In the study we read this:

*"In a sampling of 21 similar studies across many fields, total quotation error rates varied from 7.8% to 38.2% (with a mean of 22.4%) …Furthermore, a meta-analysis of 28 quotation error studies in medical literature found an overall quotation error rate of 25.4% [**1**]. Therefore, the 25% overall quotation error rate of this study is consistent with the other studies."*

In the paper we also read the following: "It has been argued through analysis of misprints that only about 20% of authors citing a paper have actually read the original." If this is true, we can get a better understanding of why so much misinformation is floating around in neuroscience papers. We repeatedly have paper authors spreading legends of scientific achievement, which are abetted by incorrect paper citations often made by authors who have not even read the papers they are citing.

An article at Vox.com suggests that scientists are just as likely to make citations to bad research that can't be replicated as they are to make citations to good research. We read the following:

"The researchers find that studies have about the same number of citations regardless of whether they replicated. If scientists are pretty good at predicting whether a paper replicates, how can it be the case that they are as likely to cite a bad paper as a good one? Menard theorizes that many scientists don't thoroughly check — or even read — papers once published, expecting that if they're peer-reviewed, they're fine. Bad papers are published by a peer-review process that is not adequate to catch them — and once they're published, they are not penalized for being bad papers."



The above suggests a good rule of thumb: when you read a science paper citing some other science paper, assume that it is as likely as not that the authors of the paper citing the other paper did not even read the other paper. Another good rule of thumb: be very skeptical of any claims you read in a neuroscience paper claiming that something is "well established" or "not controversial." Such claims are routinely made about things that have not been well established by observations.

What goes on in the highly diseased world of neuroscience research is: (1) when neuroscientists produce shoddy poorly-designed research that seems to back up the dogmas of neuroscientists, such research gets cited endless times; (2) when neuroscientists produce solid well-designed research that seems to defy the dogmas of neuroscientists, such research may be almost never cited.

An example of (2) is the very important "Dream Catcher" study entitled "The Dream Catcher experiment: blinded analyses failed to detect markers of dreaming consciousness in EEG spectral power." In the study the brain waves of people were measured as they were woken up at random times during sleep. The people were asked whether they were dreaming when they were woken. Analysts were given brain waves of the woken people, without being told which ones said they were dreaming when awoken (the brain waves being those that occurred when they were awoken, and slightly beforehand). The analysts were asked to predict which people were dreaming when awoken. The results were not different from chance. Whether people were dreaming could not be predicted from brain waves. This very important result suggests that dreaming is not produced by brains. But such a result defies the dogmas of neuroscientists, so the study has almost never been cited by neuroscientists. The study has been cited only 15 times.

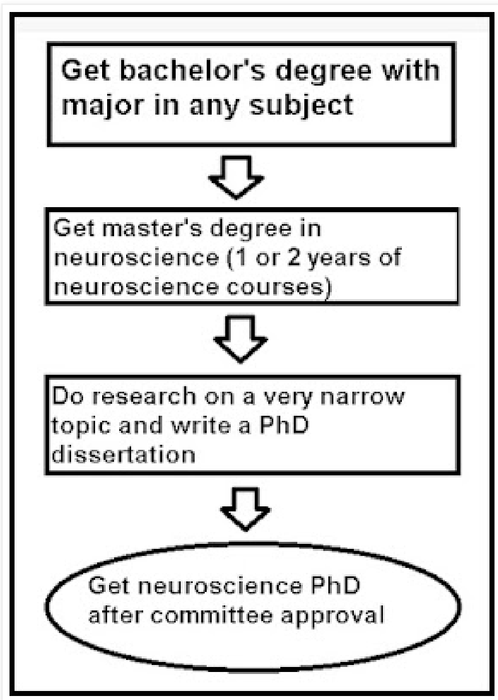
at September 11, 2022 No comments:

Sunday, September 4, 2022

Given Their Narrow Studies and Slim Narrow PhD Dissertations, Why Are We So Swayed by Neuroscience PhDs?

The tendency of the average person to be in awe of someone holding a PhD is a tendency that often does not make sense. Let us consider some reasons why you should not assume some person is speaking correctly about some complex topic merely because that person has a PhD in some subject relevant to that topic.

The first reason is that people often don't have to do all that much studying relevant to some topic to get a PhD that may be considered relevant to that topic. To get a PhD in some field, you need typically to first do one or two years of study on that topic, taking courses in a graduate school. You normally cannot enter such a graduate school until you first get a bachelor's degree. But it is not at all true that you need to have first got a bachelor's degree with a major in such a topic. For example, you do not need to get a bachelor's degree in neuroscience before being admitted into a graduate program in neuroscience. In fact, you do not even have to have a bachelor's degree in biology before entering a graduate program to get a master's degree in neuroscience. So it typically works like this:



Getting a neuroscience PhD

Some universities are granting master's degrees in neuroscience after only a single year of study.

Very many people make the mistake of thinking that someone with a PhD in some subject must have spent much more time studying the topic than someone with a bachelor's degree in that topic. That is not necessarily so. A person getting a bachelor's degree in some topic may have earned 60 college credits by taking courses in that subject, along with 60 general education credits in other subjects. A person getting a PhD in some subject might earn only 72 college credits in the subject, with between 28 and 60 of the credits being course credits (the rest being credits granted for doing research). The courses in graduate programs are normally harder than the courses you take to get a bachelor's degree. But the total amount of time someone took in studying a topic to get a master's degree or PhD in that topic may be not much greater than the total amount of time someone took to get a mere bachelor's degree in that topic.

The second reason for not being so in awe of PhD's is that the program of study you must complete to get a PhD is often a narrow program of study. So, for example, you can get a PhD in neuroscience without doing hardly anything to study the human mind and human behavior. We should not make the mistake of assuming that a person getting a PhD in some topic relevant to a question is a person who has studied most of the information that is relevant to that question. Such a person may have had a very narrow type of studying in which he learned about only a small fraction of the things relevant to the question being studied.

For example, someone lecturing you about the mind-body relation may have done much studying of bodies and very little studying of minds. You can get a neuroscience PhD without doing much of any studying of human minds and the full spectrum of human mental states and human behavior. Let's look at one example. One of the leading universities near me granting medical-related degrees in New York state is Stony Brook University (also called SUNY Stony Brook). Below (as listed on this page) are the "core courses" that are required to get a neuroscience master's degree from this university:

- Introduction to cellular neuroscience
- Introduction to molecular neuroscience
- Sensory and motor systems
- Neural Plasticity, Learning and Memory
- Introduction to Neural Computation
- Statistics and Data Analysis
- Intro to Computational Neuroscience
- Statistics and Data Analysis II
- Intro to Mammalian Neuroanatomy

Below are the "elective courses" that you can choose from to meet the requirements for the master's degree in neuroscience:

- NEU 517: Cellular Signaling (Fall, 3 credits)
- NEU 534: Principles of Neurobiology (Spring or Summer, 3 credits)
- NEU 537: Neurotransmission and Neuromodulation (Spring, 3 credits)
- BNB 563: Advanced Topics in Neuroscience I (Fall, 1-3 credits)
- BNB 564: Advanced Topics in Neuroscience II (Spring, 1-3 credits)
- BNB 565: Developmental Neuroscience (Fall, 1 credit)
- BNB 566: Neurobiology of Disease (Spring, 1 credit)
- BNB 597: Seminar Themes (Fall, 1 credit)
- JRN 501: Foundations of Science Communication I (Fall or Spring, 1 credit)
- JRN 503: Foundations of Science Communication II (Fall or Spring, 1 credit)
- GRD 500: Integrity in Science (Spring, 1 credit)
- BGE 510: Graduate Genetics (Spring, 3 credits)
- MCB 503: Molecular Genetics (Fall, 3 credits)
- MCB 520: Graduate Biochemistry I (Fall, 3 credits)
- MCB 656: Cell Biology (Spring, 4 credits)

Notice something missing here? There isn't a single course in psychology or human behavior. There isn't a single course that will involve studying the topics of the human mind and the vast variety of human mental states and the vast variety of mental experiences that humans have. My guess is that the course on "Neural Plasticity, Learning and Memory" is mainly devoted to discussing neuroscience experiments on memory, which is mainly research based on rodents.

Why should we think that anyone is qualified to lecture us on the source of human minds or the nature of human minds when they have merely taken courses such as those listed above? Why should we think anyone is qualified to make claims such as "all mental states are brain states" or "all behavior is brain produced" when they may not even have decently studied human mental states and human behavior and human mental experiences? A thorough study of human mental states and human mental behavior requires reading many hundreds of long volumes. You can probably get a neuroscience PhD without reading any of such volumes.

Similarly, the page for the Rutgers Neuroscience PhD program tells us you get a PhD from that program with as little as 28 course credits (a typical college freshman will earn 30 course credits in his first year). The page lists a narrow course of required study that does not require any psychology courses:

"All students must complete a total of 72 combined credits required for the Ph.D. degree. Of the 72 credits, at least 28-course credits (at a minimum B grade average) are required, of which 24 must be at the 500 level or above. Required courses include 8 seminar credits of Advanced Studies in Neuroscience, 1 credit of Ethical Scientific Conduct, 3 credits Neurobiology 555, a Statistics course, one biochemistry-cell biology course, and an Ethics Refresher course. Up to 44 research credits are also required to bring the required total to 72."

Since the "research credits" mentioned are typically limited to some *extremely* narrow topic, we have here a narrow and very limited course load to get a neuroscience PhD. It seems that you can a get Rutgers PhD in neuroscience while doing very little to study minds or human behavior.

But should we be very impressed by PhD's because they have written a PhD dissertation, typically a document of more than 100 pages? Not really. One reason is that PhD dissertations are almost always on extremely narrow topics. The fact that the dissertation was written does nothing to show that the person did much more to gain general broad knowledge about the subject he is getting a PhD in. So, for example, you might study two years to get a master's degree in US history. You then might do your PhD dissertation on some very narrow topic such as the social and economic factors that helped caused the Panic of 1893. But research so narrow does little to show that you improved your general knowledge of US history after getting your master's degree in US history.

A similar situation holds true in regard to neuroscience PhD dissertations. Such PhD dissertations are almost always extremely narrow in focus. The page here allows you to see the titles of some recent neuroscience PhD dissertations submitted at Emory University. In the first 3 pages of search results, we see the following examples:

- Voltage-gated Sodium Channels as Modifiers of Scn1a-derived Epilepsy
- On the mechanisms of presynaptic inhibition of primary afferents
- Cellular oxygen-sensing through HIF-1α and NF-κB: A therapeutic target for ischemia.
- The role of calcineurin in the recovery of cognitive function following isoflurane anesthesia
- Inhibition of the schizophrenia-associated microRNA miR-137 disrupts Nrg1α neurodevelopmental signal transduction
- Characterization of LR11/SorLA in Mild Cognitive Impairment

- Modulators of behavioral sensitivity to cocaine following dopamine β-hydroxylase (DBH) inhibition
- Transcriptional regulation of Homer1a during Pavlovian Fear Conditioning
- The cellular role of Atoh1 in development and regeneration in the mammalian cochlea
- A role for the synaptic vesicle glycoprotein 2C (SV2C) in dopamine homeostasis and Parkinson's disease
- Neuroadaptive Changes in the Serotonin System Associated with Chronic SSRI Treatment in the Context of Cocaine Use
- Functional and structural subdomains of the intracellular loop domain of the GABAAR α1 subunit
- Cellular Trafficking and molecular heterogeneity of amyloid beta seeds. How similar are beta amyloid aggregates and prions?
- Protective Actions of the Brain-Expressed Receptors GPR37 and GPR37L1 in Models of Neurological Disease

As we can see from the examples above, neuroscience PhD dissertations tend to be extremely narrow in focus. There's no reason to think that anyone doing research on topics so narrow would necessarily acquire much more general knowledge about neuroscience by doing research so narrow.

Another reason we should not be too impressed by people doing neuroscience PhD dissertations is that such dissertations tend to be rather slim in length. There is a very interesting graph in the long blog post here, entitled "How long is the average dissertation?" According to the graph at the end of the post, PhD dissertations in history tend to be an average of about 300 pages, but PhD dissertations in neuroscience tend to be average of only about 130 pages. The graph lists neuroscience PhD dissertations as being some of the shortest PhD dissertations of about 100 subjects examined.

The post also reminds us that there may be relatively little prose required to produce a PhD dissertation, telling us this:

"However, most don't realize that dissertations are filled with lots of white space, e.g., pages are one-sided, lines are double-spaced, and the author can put any material they want in appendices. The actual written portion may only account for less than 50% of the page length."

PhD dissertations can be filled up with graphs, long quotations, and long data tables, requiring the author to write relatively few words. My guess is that the average neuroscience PhD dissertation has maybe something on the order of 10,000 to 20,000 original words. Ignore online statements claiming that PhD dissertations are about 60,000 words. It seems that people are getting neuroscience PhD's with dissertations that are several times shorter than 60,000 words.

For comparison, one or more of the individual blog posts that I have written (among thousands of posts on my blogs) probably have more original words of text than in many a neuroscience PhD dissertation. My post here has 9000+ words, and my post here has 29,000+ words (almost none of them quoted words). The total number of neuroscience-relevant words I have written for this blog's posts is probably several times greater than the number of words in the average neuroscience PhD dissertation. The total number of relevant citations of neuroscience papers I have made on this site is probably several times greater than the number of neuroscience literature citations contained in the average neuroscience PhD dissertation.

It is estimated that the vast majority of PhD dissertations are read by only very few people, fewer than twenty. It seems that most PhD dissertations do not even get published as scientific papers. A paper states, "Results showed that only one-quarter (25.6% [95% CI: 23.0, 28.4]) of dissertations were ultimately published in peer-reviewed journals."

There is no particular reason why we should be in awe of someone's authority merely because that person has a neuroscience PhD. You only have to do about one or two years of coursework to get a master's degree in neuroscience, almost all of it very narrowly focused. No great amount of broad study is needed to move from a master's degree in neuroscience to a PhD in neuroscience. No broad study of the human mind or human mental states or human behavior is required to get a neuroscience PhD. You can get a neuroscience PhD without ever having studied the full spectrum of human mental capabilities or human mental states or mind-relevant human observations. Very many neuroscience PhDs make statements suggesting they have dismally failed to make any broad study of human minds and human behavior, and very many neuroscience PhDs make statements suggesting they have failed to properly study relevant low-level research findings about brains and their components, findings suggesting brains or their components are too slow, noisy, unreliable and unstable to be foundations of human mind and memory (contrary to the typical claims of neuroscientists). Many of those findings are discussed on the posts of this blog.

The human mind (including the full spectrum and diversity of human mental experiences and capabilities) is a topic of oceanic depth. Most neuroscience PhDs are not mind experts, but merely brain experts. Why should we have great confidence when we hear statements about the source of human minds, coming from those who are not mind experts?

You can use Google scholar (https://scholar.google.com/) to get abstracts of the published papers of particular neuroscience PhD's. Just go to https://scholar.google.com/ and type in a person's name. You will typically find that their papers have a narrow focus, as if the scholar spent most of his time "looking through a strawhole." Don't be too impressed by a "strawhole scholar." If you want to hitch your wagon to some authority, look for some scholar of very broad learning. Better yet, never put too much weight on the teachings of any one person, but let the "universe of observations" in all its spooky diversity be your main guide.

at September 04, 2022 2 comments:

Labels: narrowness of neuroscientist studies

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Head Truth

The huge case for thinking minds do not come from brains

Sunday, August 28, 2022

Longtermism Is Fueled by a Goofy Belief in Computer-Generated Lives

Reeently I have started to read more and more articles discussing a philosophy called longtermism. I can distinguish between two different versions of longtermism:

(1) What we may call reasonable-sounding longtermism, in which longtermism is defined as something like the belief that future people matter as much as currently living people. A philosopher named William MacAskill defines longtermism as "the view that positively influencing the longterm future is a key moral priority of our time." A recent New York Times guest essay by the same person is entitled "The Case for Longtermism." What we read about sounds pretty reasonable. No mention is made of interstellar colonization or computer-simulated lives. MacAskill's essay has a moral tone.

(2) A far more imaginative form of longtermism, what we may call sci-fi longtermism. This version is based on extremely far-out speculations, some of which are very goofy. The speculations seem like outgrowths of the hazardous speculations of Nick Bostrom, the father of the morally destructive "simulation hypothesis," that we humans are living in a computer simulation created by extraterrestrials.

Let me explain why Bostrom's simulation hypothesis is morally destructive, and how it evolved into sci-fi longtermism. Bostrom's simulation hypothesis was based on the idea that human conscious experience such as you and I are now having can be generated by computers. There was never any warrant for this speculation. While human experience can be influenced by computers generating visual content that humans interact with, there has never been the slightest shred of evidence that a computer is capable of generating conscious experience like humans have. The idea that a computer can generate conscious experience has always been as silly as the idea that your TV set can not merely show you dinosaur images, but also generate dinosaurs, so that physical dangerous dinosaurs leap out from your TV screen.

Despite a lack of any warrant for the claim that computers can generate conscious experience, Bostrom advanced the simulation hypothesis, speculating that maybe all of our lives are produced by some computer simulation. But how could we be part of such a simulation, when no computer known to man has ever produced a speck of anything like conscious experience? Bostrom's answer was that maybe the computers generating our conscious experience are produced by super-advanced extraterrestrial civilizations that originated eons ago.

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Many people warmed up to this idea, but I think very few of them realized how morally perilous such a speculation is. The moral hazards of believing in this simulation theory seem almost as bad as the moral hazards of believing in solipsism, the idea that your mind is the only mind in the universe. If your life was merely something produced in some computer of an extraterrestrial civilization, there is no reason we can think of why such extraterrestrials would tend to arrange things so that every person you saw in your conscious experience would actually be a conscious person. It would be much easier to just arrange some simulation so that human bodies appearing in a simulation might be imaginary constructs (like in video games) without corresponding minds.

When I play *Star Wars: Battlefront II* on my Playstation 4, as I am very enjoyably doing these days, I can destroy as many shiny white imperial stormtroopers as I want, without any moral feelings, thinking, "They're just detailed shapes in the simulation." And anyone believing that his life is just some computer simulation produced by extraterrestrials might without guilt kill people, thinking, "They're just detailed shapes in the simulation."

So once a person believes in some simulation hypothesis, he may feel free to maim, rape, steal and kill as much as he wants, while thinking, "I didn't really harm anyone, because they were just human shapes generated by the computer simulation in which I'm living." Bostrom's simulation hypothesis was a form of poisonous nonsense. A good rule to follow is: never leave your children or your money or your property in the hands of someone believing in Bostrom's simulation hypothesis, because such a person's moral behavior is unpredictable. For example, such a person might harm your money or your children or your property in any way that pleases him, while thinking, "These are just shapes being generated by the computer simulation set up by extraterrestrials."

How does the simulation hypothesis relate to sci-fi longtermism? The proponents of sci-fi longtermism do not as a rule believe that we humans are now living in a computer simulation created by extraterrestrials.
But proponents of sci-fi longtermism tend to maintain that in the far future humans will be able to create "computer-simulated lives" rather in the way that Bostrom imagined extraterrestrials doing.

What is going on is that these proponents of sci-fi longtermism are imagining scenarios under which humans spread throughout the galaxy, while setting up computer servers all over the galaxy dedicated to generating computer-generated lives. We read about this in an article entitled "Against Longtermism" by Emile P. Torrez. He says this:

"This is why longtermists are obsessed with calculating how many people could exist in the future if we were to colonise space and create vast computer simulations around stars in which unfathomably huge numbers of people live net-positive lives in virtual-reality environments. I already mentioned Bostrom's estimate of 10^{54} future people, which includes many of these 'digital people', but in his bestseller Superintelligence (2014) he puts the number even higher at 10^{58} people, nearly all of whom would 'live rich and happy lives while interacting with one another in virtual environments'. Greaves and MacAskill are similarly excited about this possibility, estimating that some 10^{45} conscious beings in computer simulations could exist within the Milky Way alone. That is what our 'vast and glorious' potential consists of: massive numbers of technologically enhanced digital posthumans inside huge computer simulations spread

throughout our future light cone. It is for this goal that, in Häggström's scenario, a longtermist politician would annihilate Germany. It is for this goal that we must not 'fritter … away' our resources on such things as solving global poverty. It is for this goal that we should consider implementing a global surveillance system, keep pre-emptive war on the table, and focus more on superintelligent machines than saving people in the Global South from the devastating effects of climate change (mostly caused by the Global North). In fact, Beckstead has even argued that, for the sake of attaining this goal, we should actually prioritise the lives of people in rich countries over those in poor countries, since influencing the long-term future is of 'overwhelming importance', and the former are more likely to influence the long-term future than the latter. "

How could anyone come up with such inflated figures, by estimating a total of 10^{58} future people? There are currently about 140 million people born per year. Rounding this up to 1 billion per year after assuming large levels of some space colonization, and very optimistically assuming that the human race could survive for a billion years, we can get a very optimistic estimate of 10^{18} humans living in the future. How are these sci-fi longtermists coming up with an estimate more than 1,000,000,000,000,000,000,000,000,000,000,000,000,000 times larger, an estimate of 10^{58} future people? It is by assuming that most of the lives will be computer-generated lives.

In another article describing sci-fi longtermism, we read this:

"Longtermism is a quasi-religious worldview, influenced by transhumanism and utilitarian ethics, which asserts that there could be so many digital people living in vast computer simulations millions or billions of years in the future that one of our most important moral obligations today is to take actions that ensure as many of these digital people come into existence as possible. In practical terms, that means we must do whatever it takes to survive long enough to colonize space, convert planets into giant computer simulations and create unfathomable numbers of simulated beings. How many simulated beings could there be? According to Nick Bostrom —the Father of longtermism and director of the Future of Humanity Institute — there could be at least 10^{58} digital people in the future, or a 1 followed by 58 zeros."

This is all very big nonsense. Human conscious experience cannot be generated by computers. The posts of this blog provide the strongest evidence for rejecting all claims that human conscious experience has any material explanation. Neuroscientists are unable to provide credible explanation for how brains could produce any of the main aspects of human experience, things such as:

- self-hood
- abstract idea creation
- appreciation
- memory formation
- moral thinking and moral behavior
- instantaneous memory recall
- instantaneous creation of permanent new memories
- memory persistence for as long as 50 years or more
- refined emotions such as romantic love

- speaking in a language
- understanding spoken language
- creativity
- insight
- beliefs
- intellectual pleasure
- reading ability
- writing ability
- ordinary awareness of surroundings
- visual perception
- recognition
- auditory perception
- attention
- fascination and interest
- the correct recall of large bodies of sequential information (such as when someone playing Hamlet recalls all his lines correctly)
- eyes-closed visualization
- extrasensory perception (ESP)
- dreaming
- volition
- out-of-body experiences

Why do we have such experiences and capabilities? Because we are souls. Neither brains nor computers have any ability to create souls or conscious minds. The belief that human beings are souls is well-supported not merely by a study of the low-level facts of neuroscience (which collectively show brains cannot explain minds and memory), but also by innumerable written observations of psychic and paranormal phenomena that distinguished humans have made for more than 200 years (read here for a review of such observations). Advocates of sci-fi longtermism have not adequately studied the neuroscience evidence they should have studied, and have also not studied the extremely abundant evidence for human souls. Such people seem to have been lost in a world of science fiction speculation. Instead of spending so much time pondering what will happen in the Milky Way galaxy during the next billion years, such people should have spent more time studying the full spectrum of what people have reported seeing and experiencing here on planet Earth.

The idea that something like conscious human experience can arise from a computer is as silly as the idea that squeezing rocks can produce goblins.

- Why Brains Are Not Suitable for Storing Long Sequences Like Humans Remember
- Why Brain Scans Don't Show Brains Make Minds
- Why Strokes, Alzheimer's Disease and Drunkenness Don't Prove the “Brains Make Minds” Dogma
- Synaptic Density Studies Contradict the Most Popular Memory Theory
- The Rare "Total Recall" Effect That Conflicts with Brain Dogmas
- Physical Connections Do Nothing to Explain Cognition
- The Sociological Reasons Why Bad Explanations Persist in Academia
- Split-Brain Cases Conflict with "Brains Make Minds" Dogma
- Why So Much of Neuroscience News Is Unreliable
- An Analogy Clarifying Why the "Brain Stores All Your Memories" Dogma Is Untenable
- Why Darwinism Fails to Explain the Human Mind
- What Is It That a Brain Does?
- Cloud Computing and a Non-Local Model of Consciousness
- Why We Do Not Understand the Origin of Complex Biological Innovations
- Our Minds May Arrive Top-Down Not Bottom-Up
- Fancy New Technology Fails to Prove Memory Dogmas
- The Argument for Determinism Collapses Once We Discard the "Minds Come from Brains" Dogma
- Animal Experiments Conflicting with the Dogma That the Brain Stores All Memories
- Memory Recall Reality Versus the "We Can't Remember Well" Bunk of Professors
- Neuroscientists Keep Using Misleading Coloring in Brain Visuals
- Most Scientists Don't Follow Formal Evidence Standards, Unlike Judges
- Experimental Evidence for ESP Is Well-Replicated
- Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades
- NIH Bets $1,434,188 That Synapses Don't Store Memories
- A New Case of Very Large Brain Damage and Normal Mental Function
- When Clue-Blind Professors Ignore All the Signs

Human minds with all their diverse powers and aspects cannot arise from any "bottom up" effect, either neural or mechanical, but we can credibly believe they arise from some "top-down" effect involving a mysterious unfathomable metaphysical source of minds and souls. Such a source may also be involved in the origin of individual human bodies, because the progression from a speck-sized zygote cell at the beginning of pregnancy to the vast hierarchical organization of an adult human body (not at all specified by DNA) is a wonder of origination a thousand miles over the heads of today's scientists. So rather than deluding yourself by thinking that some person you see across the street is merely some detailed shape produced by an extraterrestrial computer simulation, say to yourself: that person is a soul like myself, who I should treat with respect, like all souls.

at August 28, 2022 No comments:

Labels: longtermism, simulation hypothesis

Sunday, August 21, 2022

Shrink-Speaking About a Mere "Problem of Consciousness" Is As Wrong As Shrink-Speaking About a Mere "Problem of Human Shape Origination"

A recent paper by a physicist is the latest paper by a mainstream scientist claiming to offer a solution to a "problem of consciousness." After you read the title ("A Relativistic Theory of Consciousness") you should chuckle. The term "relativistic" refers to Einstein's theory of general relativity and his theory of special relativity, neither of which has anything to do with explaining the arising of human bodies or the arising of human minds. These two theories have some relevance to whether the universe is habitable, having the kind of physical conditions that are necessary for living beings such as us. But neither the theory of general relativity nor the theory of special relativity has any relevance at all to explaining human minds. The paper is filled with obscure mathematical equations, which give us a strong clue that the author has done nothing to explain consciousness. You can't math-equation your way to explaining mind.

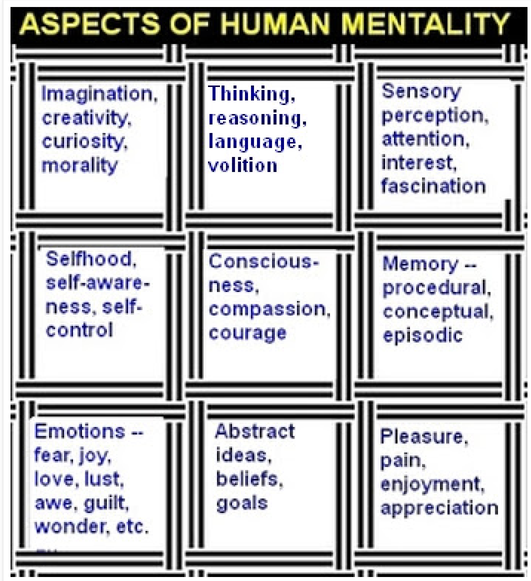
At its beginning the author goes through the usual silly talk that occurs at the beginning of such papers. A mere "problem of consciousness" is raised, defined merely as some problem of why humans have conscious experience. There are two gigantic errors that typically occur very quickly in such discussions:

(1) There is an incorrect problem statement, in which it is asked, "How can the brain give rise to consciousness?" We do not know that brains give rise to consciousness, and we have very many strong reasons (discussed on this blog) for disbelieving that brains are the cause of human consciousness, self-hood, thinking, memory recall and memory formation. So no one should be asking some question that pre-supposes a belief that is unproven and dubious. Asking "how can the brain give rise to consciousness" is as inappropriate as asking "how can the moon give rise to schizophrenia?"

(2) Given a huge quantity of mental phenomena that are not currently explained in a credible way by brain activity, it is extremely inappropriate to be raising a mere "problem of consciousness." The problem that should be raised is a much wider "problem of human mentality." The problem of human mentality is the problem of credibly explaining the thirty or forty most interesting types of human mental experiences, human mental characteristics and human mental capabilities. These include things such as these:

- Why Neuroscience Hasn't Delivered for Psychiatry
- Panpsychism Arguments Involve an Equivocation Fallacy
- He's Strangely Seeking Memories in Cells Below the Neck
- Just Call Them "Machine-Metaphor-Misguided"
- Way Off in Their Predictions, Neuroscientists Keep Misdescribing Human Memory Performance
- The Biggest Brain Projects Are Still Failing to Support Prevailing Brain Dogmas
- A New Paper Reminds Us Neuroscientists Can't Get Their Story Straight About Memory Storage
- NSF Grant Tool Query Suggests Engrams Are Not Really Science
- Suspect Shenanigans When You Hear Claims of "Mind Reading" Technology
- No, a USC Team Did Not Show "How Memories Are Stored in the Brain"
- Why ESP Discredits the "Brains Make Minds" Claim
- Beware of Neuroscientists Using Cell Nicknames
- The Press Often Gives Us Fake News About Brains
- No Solid Principle Justifies "Brains Make Minds" Thinking
- "Thousands of Participants Are Needed for Accurate Results," But Most Brain Scan Studies Don't Even Use Dozens
- Why the Academia Cyberspace Profit Complex Keeps Giving Misleading Brain Research Reports
- "Brains Make Minds" Idea Flunks an Audit of a Large Brain Scan Database
- Big Study Finds Brain Gray Matter and Cortical Thickness Peak at Age 6 or Earlier, Contradicting Brain Dogmas
- Why the "A Memory Is Stored Throughout the Brain" Idea Makes Things Much Worse
- Principles of a Post-Materialist Science
- EEG Studies Fail to Provide Robust Evidence That Brains Think or Retrieve Memories
- Seven Things in Fast Retrieval Systems, None of Which Your Brain Has
- Studies Debunk Hippocampus Memory Myths
- 11 Authorities Seem to Realize That "Your Brain Is a Computer" Is a Junk Metaphor

- imagination
- self-hood
- abstract idea creation
- appreciation
- memory formation
- moral thinking and moral behavior
- instantaneous memory recall
- instantaneous creation of permanent new memories
- memory persistence for as long as 50 years or more
- emotions
- speaking in a language
- understanding spoken language
- creativity
- insight
- beliefs
- pleasure
- pain
- reading ability
- writing ability
- ordinary awareness of surroundings
- visual perception
- recognition
- auditory perception
- attention
- fascination and interest
- the correct recall of large bodies of sequential information (such as when someone playing Hamlet recalls all his lines correctly)
- eyes-closed visualization
- extrasensory perception (ESP)
- dreaming
- volition
- out-of-body experiences
- apparition sightings



Explaining these things is a very big and wide problem that we can call the problem of human mentality origination. It is a huge mistake to try to shrink that problem into some thousand-times smaller problem that you call "the problem of consciousness," and to speak as if it was merely consciousness that needs to be explained. As soon as you start reading a paper that starts out by posing a mere "problem of consciousness," you have a strong reason for suspecting that the paper is not worth reading. The person posing a mere "problem of consciousness" is like some economist who poses a mere "problem of street traffic obstruction by beggars" rather than posing a much wider "problem of poverty" or a "problem of economic inequality."

It is all too easy to understand why scientists engage in this kind of shrink-speaking. A "million-kilogram" problem is one that is very hard to credibly solve. But if you can use shrink-speaking to make it sound like the problem is a mere "one kilogram" problem, then maybe you can make people think you have a solution. For example, the problem of reducing the danger of nuclear weapons is an incredibly hard problem. But if someone tries to shrink the problem down to a mere "excess heat" problem, maybe he can persuade you that he has a solution involving "compensatory cooling." Or if someone tries to shrink the problem of nuclear weapons down to a mere "dust dispersion" problem, then maybe he can persuade you that he has a solution involving "more efficient vacuum cleaning." Trying to shrink the problem of human mentality down to a mere "problem of consciousness" is as silly as such examples of trying to shrink a problem.

There is another place in science where we see scientists shrink-speaking in a way that tries to make a "million-kilogram" problem sound like a "one kilogram" problem. That place is developmental biology. Developmental biology has the "million-kilogram" problem of how it is that the simplicity of a speck-sized zygote cell (a fertilized ovum) is able to progress to become the vastly more organized structure of a full human body. This is the problem of the origin of the structure of an adult human being. It consists of many questions that are currently far beyond the ability of material science to credibly answer. These questions include the following:

(1) How is it that polypeptide sequences (mere chains of amino acids) are able to organize so quickly into the distinctive three-dimensional shapes that are

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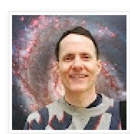

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functional protein molecules? We know of about 20,000 different types of human protein molecules (each with its own unique sequence of amino acids), each of which has a distinctive three-dimensional shape. But we do not know what causes such simple sequences of amino acids to form into the three-dimensional shapes needed for protein molecules to be functional.
(2) How is that 200 different types of incredibly organized human cells are able to originate in the human body, which has DNA that merely contains low-level chemical information, and does not contain any specification of the structure of a cell, or any of its components called organelles?
(3) How is it that cells are able to become organized into the tissues that are needed for humans to live?
(4) How is it that such tissues are able to become organized into the organs that are needed for humans to live?
(5) How is it that organs are able to become part of extremely organized organ systems?
(6) How is it that the exterior structure of the human body is able to arise, with structural features such as the two arms, two legs, ten toes, ten fingers, and one neck?
(7) How is it that there is able to arise the skeletal system consisting of a specific arrangement of 206 bones?
(8) How is it that the incredibly dynamic biochemistry of the human body is able to arise and persist?

DNA gives us none of the answers to these questions. DNA specifies only low-level chemical information. DNA does not specify anatomy. DNA also does not specify the incredibly intricate arrangements necessary for human biochemistry. At the end of the post here, you can read quotes by 20+ biology experts telling us in various ways that it is untrue that DNA is a blueprint, program or recipe for building a human. Even if such a blueprint existed in DNA, it would not explain the origin of adult human bodies, for the simple reason that blueprints don't build things. Blueprints are guides used by intelligent agents that use blueprints to get ideas about how to build things.

Faced with such mysteries, developmental biologists often try a trick of shrink-speaking. They often try to reduce the "million-kilogram" problem of the origin of structure in a single human body (during the nine months of pregnancy) to a "one kilogram" problem of "the origin of a human shape." Of course, the problem of the arising of an adult human body from a vastly less organized speck-sized zygote is a problem enormously larger than a mere problem of the origination of a human shape.

There are three general reasons why each one of us is a wonder far beyond the explanation of physical science:
(1) Physical science has no explanation for the vast amount of organization occurring when a simple one-cell zygote (lacking any anatomy blueprint in its DNA) progresses from such a speck-sized simplicity to the hugely organized state of a human body.
(2) Physical science has no credible explanation for the appearance of an adult human mind, because such a thing is not credibly explained by the appearance of a brain, for reasons given in the posts of this blog.
(3) Physical science has no credible explanation for the improbably habitable universe we live in. The chance of a random universe having conditions needed for living things is microscopic. A huge amount of fine-tuning is needed for a universe that can have planets and sun-like stars or any type of long-lived

radiant stars. To give one of many examples of precise fine-tuning needed for a habitable universe, were there not a perfect balance between the absolute value of the proton charge and the electron charge (despite protons being 1836 times more massive), with these two numbers being equal to 1 part in a billion billion, stars and planets would not even hold together (for reasons explained by the astronomer Greenstein). Random universes are lifeless and lightless. The only "explanation" physical science has offered is the bad joke that is the claim of a multiverse (that there exists some infinity or near-infinity of universes, each with different conditions). Such an explanation does nothing to explain why we live in a habitable universe. You do not increase the chance of any one universe being habitable by imagining some infinity of universes. Similarly, you do not increase the chance of any one lottery ticket buyer becoming a millionaire in a lottery win if you imagine millions of lottery ticket buyers.

We may imagine the following conversation between a curious young boy and a distracted mother walking on the street.

Boy: *Mommy, who made the clothes I wear? And who made the TV shows I watch? And who made the cars I see? And who made the street lights?*

Mother: *The answers are simple, my son. They are: Santa Claus, Santa Claus, Santa Claus, and Santa Claus.*

We can also imagine a similar conversation between a philosopher and a neuroscientist.

Philosopher: *From whence comes that hint of the transcendent we feel when we look at a sky ablaze with stars? From where do our loftiest ethical principles arise? Why do we lie awake and ponder the weightiest riddles of existence? How do we ever grasp the most abstract notions such as the idea of the universe and the eternal laws of nature?*

Neuroscientist: *The answers are simple. They are: neurons, neurons, neurons, and neurons.*

When we are told such an answer, we are being fooled as badly as the small child is being fooled in the example above.

at August 21, 2022 No comments:

Sunday, August 14, 2022

So Much Misleading Talk Occurs in Claims of a Scientific Consensus

These days scientists enjoy a reputation for being honest people, and probably most of them are honest. But it is strange that scientists in general enjoy such a reputation for speaking honestly. Very many scientists are guilty of misleading statements. In the post here I describe some of the many misleading speech patterns of many scientists. In this post I will focus on one of the examples I gave in that post: the misleading use of the term "scientific consensus." Nowadays, this term is being used massively by scientists and science journalists, often in a very misleading way.

Labels

The first thing that should be discussed is: what is meant by the term "consensus"? To get a proper sense of the denotation and connotation of that word, we should look at how "consensus" is defined by various dictionaries. Below is how "consensus" is defined by various dictionaries and authorities:

- A Google search for "consensus definition" gives "a general agreement" as the first result.
- The Merriam-Webster dictionary gives us two defintions of "consensus" that disagree with each other. The first definition is "general agreement; unanimity." The second definition is "the judgment arrived at by most of those concerned." The first definition specifies 100%, and the second definition merely means 51% or more.
- Dictionary.com also gives us two defintions of "consensus" that disagree with each other. The first is "majority of opinion." The second is "general agreement or concord; harmony." The second definition implies near-unanimity; the first does not.
- The Collins dictionary defines "consensus" as "general agreement among a group of people."
- The Britannica dictionary defines "consensus" as "a general agreement about something : an idea or opinion that is shared by all the people in a group."
- Vocabulary.com defines "consensus" as "agreement in the judgment or opinion reached by a group as a whole," and at the very beginning of the page with this definition, we are told that "when there's a consensus, everyone agrees on something."
- The Cambridge Dictionary defines "consensus" in two ways: (1) "a generally accepted opinion among a group of people"; (2) "agreement among a group of people."
- The Macmillan dictionary defines "consensus" as "agreement among all the people involved."

From the definitions above, you can make the following conclusions:

(1) "Consensus" is a word that is often defined as if it meant a unanimous opinion on some topic, but also often defined as if it meant a mere majority opinion on some topic.

(2) Because it is often defined as if it meant a unanimous opinion on some topic, "consensus" is undeniably a word with at least a strong connotation of meaning a unanimous opinion on some topic, with everyone agreeing about it. The connotation of a word is the kind of impression or feeling that the word creates, regardless of how the word is literally defined.

Because it is defined in ways that conflict with each other, "consensus" is a slippery and ambiguous word to be using. You might call it a very treacherous term, a term very prone to mislead or confuse. Since it has two very different definitions, using the word "consensus" is as potentially misleading as using the word "gay" soon after people first started to use that term to mean "homosexual," at a time when it was hard to tell whether "gay" meant "homosexual" or simply "merry."

One of many deceptive speech habits occurring in science literature is that misleading claims are being made of a "scientific consensus" about opinions which do not at all involve any unanimity of opinion among scientists. Because of how often "consensus" is defined to mean "unanimty of opinion," such claims are designed to create an impression that scientists agree about something. But typically there is no evidence that anything close to 100% of scientists agree on such an opinion, and in very many cases there is not even good evidence that a strong majority of scientists believe in the opinion.

Because of the almost total non-existence of secret ballot polls of scientists, there are almost no claims about scientist opinions that are well supported by evidence. We know that certain opinions are what we may call reputed majority opinions of certain types of scientists. For example, it is repeatedly alleged that most cosmologists believe in dark matter and that most biologists believe in the doctrine of common descent, that all species are descended from a common ancestor. But what percentage of cosmologists believe in dark matter, and what percent of biologists believe in the doctrine of common descent?

You cannot tell such a thing by asking for a show of hands at a meeting of cosmologists or a show of hands at a meeting of biologists. When there is a reputed majority of opinion about something in some scientific field, a scientist in that field may think that he will get in trouble by publicly stating an opinion contrary to the majority in his field. So such a scientist may fail to honestly state his opinion whenever he can be publicly identified as someone holding a contrarian opinion.

You can try to figure out what scientists think about a hypothesis by going through their public statements, but that would be a not-very-reliable approach. Publicly scientists will often make statements that do not show a definite belief about something. For exampe, having read innumerable scientific papers on memory, I know that an extremely common type of statement in such papers is for a neuroscientist to say something like this: "It is commonly maintained that memories are stored in synapses." But what does that tell us about what the author of the paper believes? You cannot tell.

The only way to get a reliable measure of the opinion of a scientist is to do a secret ballot poll, one that includes a variety of belief options including "I don't know" or "I'm not sure." However, such polls are virtually never done. When opinion polls of scientists are done, they typically fail to be secret ballots, and also fail to offer a full spectrum of answers including options such as "I don't know" or "I'm not sure."

Here are some of the main shady tricks of consensus claimants, people trying to make it sound as if scientists agree about topics when there is no good evidence that such agreement exists:

(1) Inappropriate use of the word "consensus": Given the fact that the word "consensus" is so often defined to mean unanimity of opinion (as we saw by the definitions above), anyone who uses the word "consensus" to describe something that is not a unanimity of opinion should be labeled as someone who has written or spoken in a misleading way.

(2) Making claims of consensus based on dubious interpretations of scientific papers. The classic example of a misleading analysis of this type was the paper (mentioned below) that analyzed public papers on climate change, and tried to make it sound like the papers showed a 97% consensus on a topic when what was really going on was most of the authors stating no opinion on the topic.

(3) Using shifting or inconsistent definitions when trying to back up claims of consensus. A classic trick of consensus claimants is to use shifting, inconsistent language while making consensus claims. For example:

- A Darwinism enthusiast will try to suggest unanimity about evolution by citing some poll suggesting almost all biologists believe that "humans evolve over time." Belief in this very weak claim (disputed by virtually no one) will then be used to make a claim of consensus about an entirely different claim, a much more presumptuous claim, such as a claim of common ancestry of all species or a claim that evolution is the main cause of human origins.
- To depict unanimity about climate change, someone may cite some poll asking about "whether global warming is real" or about "whether human activities contribute to global warming," and then use those results to claim a consensus that "human activities are the main cause of global warming," which is a proposition more presumptuous than those two claims, or use those results to claim a consensus that "most of global warming is caused by human activities," which is a proposition even more presumptuous than those two claims.

Consensus claimants often use shady tricks like this

(4) Failing to cite secret ballot polls. A poll of scientists that fails to use a secret ballot technique should not be trusted. If a secret ballot is not used, there will be too large a chance that a scientist will avoid stating a controversial opinion for fear of getting in trouble for defying the reputed norms of his peers. The only reliable way to do an opinion poll of scientists is to do a secret ballot poll, but almost never are such polls done. Unless a poll of scientists specifically claims to have been done using a secret ballot technique, we should always assume no such technique was used. Anyone doubting that scientists would live in fear of getting in trouble by stating unconventional opinions should study my post here, which documents a recent case of a major science journal trying to get a PhD fired because he stated some mildly unconventional opinions in a restrained manner.

(5) Failing to use polls that offer an "I don't know" or "No Opinion" choice. Opinion polls of scientists that do not offer a choice of "I don't know" or "No opinion" are worthless. So, for example, you do nothing to properly measure scientist opinions on human origins if you offer a choice between "Darwinian natural selection" and "God creating Adam and Eve," and fail to offer a choice such as "I don't know."

(6) A misleading use of the phrase "growing consensus," often used for claims not even accepted by a majority of scientists. One of the many abuses of the word "consensus" occurs when someone makes a claim that there is a "growing consensus" about something, typically referring to some claim that is not even believed by any clear majority. We had an example of this in an article in which a scientist incorrectly claims there is a "growing consensus that spacetime (and thus also matter/energy) is not fundamental but emergent from entangled quantum information." Such an offbeat idea is not held by a majority of scientists or physicists. I may note that every time someone refers to a "growing consensus" they are using the word "consensus" in a way that contradicts one of the definitions of consensus, the definition of agreement or unanimity. If 100% of the people believe in something, such a level of 100% cannot be growing.

(7) Using subset mining to get a more compelling claim of consensus. Often an attempt to show a unanimity of scientist opinion will fail, with polls showing only something like 80% of scientists agreeing on some topic. Then paper authors will often resort to what we may call subset mining. The goal will be to slice or dice the data until some more compelling claim of consensus can be made. So did your poll of biologists find fewer than 90% of biologists endorsing Darwinian explanation of human origins? Then you can try checking a subset of those biologists: only those calling themselves "evolutionary biologists," and report on how that subset responded. Did your poll of earth scientists find that fewer than 90% of them endorse the claim that global warming is mostly man made? Then you can try checking a subset of such scientists calling themselves "climate scientists," and report on how that subset responded. Do you still have a number not high enough? Then you can get a subset of that subset, reporting on the responses of those who call themselves climate scientists and have also published at least ten papers with "global warming" in their titles.

One problem with such "subset mining" is that the very terms that scientists use to describe themselves can be an indication of what they believe. So if you select a subset of scientists that calls themselves some particular thing, you may be getting some little clique or faction or tribe that will share some common ideology. Unanimity or near-unanimity in such a small group is not persuasive, and often merely is an indication that a little belief community has formed.

For example, if rather than polling people calling themselves "biologists" or "ecologists" you poll people who call themselves "evolutionary biologists," it is not too convincing if the great majority endorses conventional Darwinism. Anyone who has decided to call himself an evolutionary biologist is already someone who has declared his allegiance to Darwinist tenets. Similarly, it may be impressive if 90% of physicists were to endorse string theory, but it is not very impressive if 90% of people calling themselves "string theory physicists" endorse string theory. Once a person starts calling himself a string theory physicist, he means he has already endorsed the speculative ideas of string theory. Similarly, it is not necessarily convincing if 97% of people calling themselves "climate scientists" endorse claims that global warming is mostly man made. It could be that the term "climate scientist" is chosen only by those endorsing such claims, with uncertain people calling themselves more general terms such as "earth scientists," "atmospheric scientists," and "meteorologists."

(8) **Bad polling methods relying on voluntary participation**. Decades ago I once briefly held two full-time jobs, working for two months as a temporary worker for the US Census Bureau. The US Census Bureau knew the correct way to do a scientific survey. They scientifically selected a certain number of people for polling on one particular topic (how many people use the

government's fishing and wildlife services), and then hired workers such as myself to keep calling such people until as many of them as possible answered a series of questions about the topic being researched.

This produces results much more reliable than a voluntary participation survey (one in which people are mailed a survey form, and may choose to fill out the form or ignore it). There are all kinds of reasons why voluntary participation surveys may produce slanted results. It may be that the people who tend to fill out such voluntary surveys are those who feel most passionately about the topic. But what kind of opinion poll are you getting when you are getting answers from those who feel most passionately about the topic? Possibly some result that does not reflect the opinion of scientists in general.

Here is a hypothetical example. Let's suppose 90% of scientists don't believe in Theory X, and don't care about it. Then suppose a survey form is mailed to 1000 scientists asking what they think about Theory X. It could be that 90% of the 100 respondents are those who believe in Theory X, and are interested enough to fill out the survey. The survey might then suggest that 90% of scientists believe in Theory X, even though 90% of them do not believe in it.

The recent paper "Knowledge overconfidence is associated with anti-consensus views on controversial scientific issues" gives us an example of misleading language using the word "consensus." Some of the misleading parts of this paper are listed below:

(1) A groundless claim is made of a scientist consensus that "consuming foods with ingredients derived from GM crops is no riskier than consuming foods modified by conventional plant improvement techniques." The only two references given to support this statement are not references to polls of scientists (one of the references being a brash board of directors statement, and the other being a very mixed report that never makes such a claim about genetically modified crops).
(2) We also have the duplicity of switching the definition of evolution, defining it one place as "humans have evolved over time" and defining it another place as "an explanation of human origins." The claim that evolution adequately explains human origins is a claim vastly more presumptuous than the mere claim that humans have evolved over time. Because gene pools undeniably change over time, almost no one disputes the idea that humans have in some sense evolved over time.

An example of a paper misleadingly using the word "consensus" is the 2021 paper "Consensus revisited: quantifying scientific agreement on climate change and climate expertise among Earth scientists 10 years later." The study involved a voluntary participation email survey of 10,929 Earth scientists, using a source listing geosciences faculty. 2780 responded, and 7.9% listed "natural processes" as the main cause for global warming, with 91.1% listing "human activity" as the main cause for global warming. The title misleadingly suggests there is "consensus" and "agreement" among Earth scientists about global warming, but its data does not show that, with about 8% of the respondents giving a response defying such an alleged consensus.

Another example of a paper misleadingly using the word "consensus" is the 2013 paper "Quantifying the consensus on anthropogenic global warming in the scientific literature." The paper led to widespread claims that 97% of climate scientists agree that global warming is mostly caused by humans, but it did not find any such thing. Instead, after examining the literature for "11 944 climate abstracts from 1991–2011 matching the topics 'global climate change' or 'global warming' " the study found that
"66.4% of abstracts expressed no position" on whether global warming was mostly caused by humans, and that of the abstracts that did state a position on this topic, 97.1 endorsed the position that global warming is mostly caused by humans. There is a very large difference between such a finding and a finding that 97% of climate scientists claim that global warming is mostly caused by humans.

Oddly, there are scientific consensus claims that are utterly inconsistent with statements that are widely made these days by scientists. It has become increasingly common and mainstream for scientists to list a "problem of consciousness" as an unsolved problem. But if we don't know what causes consciousness, then (1) we have no basis for confidence in claims that the brain is the cause of the human mind, and (2) we have no basis for claiming that we understand the origin of the human race. If you don't understand the origin of consciousness, then you have no business claiming that you understand the origin of humans. In this case two of the claimed "consensus opinions" of scientists (the claim that evolution explains human origins and the claim that brains produce minds) turn out to be inconsistent with another claim that scientists are widely making these days (that we do not understand how humans are conscious).

There have been so many outrageous misstatements by scientists and science writers that used the word "consensus" that I must recommend the general principle that as a rule of thumb you should tend to be suspicious whenever you hear a scientist or science writer making any claim about what scientists believe that uses the word "consensus." The whole idea of appealing to an alleged consensus is a poor one. When people have facts to back up their claims, they cite facts. When they lack adequate facts to back up their claims, they may appeal to some alleged consensus of experts. When we hear appeals to some alleged consensus of scientists, it does not show the claim is poorly established, but it may be a reason for suspecting such a thing. Nobody ever says there is a consensus of scientists that Jupiter exists. Someone wanting to show that Jupiter exists will show a space probe photo of Jupiter or a telescope photo of Jupiter.

I was pleased to see that the US Congress recently took action that will reduce US greenhouse gases, and I have lived a very "low carbon" lifestyle for the past ten years (although who knows whether that is being "global warming attentive" or just being a garden-variety cheapskate). Scientists reasonably wishing to provoke public action relating to global warming should appeal to the simple facts that support the probably correct claim that humans are the main cause of global warming, instead of making shaky claims misleadingly suggesting that there is unanimity of opinion among experts on this topic. Knowing that academia tribes are subject to groupthink effects, people are not very persuaded by claims of agreement in some specialized tribe of scientists that may be following a "follow the herd" rule. Rather than appealing to some agreement in such a tribe, it is better to appeal to facts.

For reasons given above, you should be extremely suspicious about all claims that there is a scientific consensus that the brain produces the mind, or a consensus that memories are stored in brains. There is no good evidence that all scientists or almost all scientists hold such beliefs. There seems to exist no study doing a secret ballot of the opinions of biologists about such topics.

If you do a Google search using the phrase "poll of neuroscients" you will find almost no examples of polls of neuroscientists other than a 2002 study entitled "Do You Know Your Brain? A Survey on Public Neuroscience Literacy at the Closing of the Decade of the Brain." The study did a poll of neuroscientists around the globe, but no claim is made that any attempt at a secret ballot was made. So we should therefore assume that the poll was not a secret ballot. In any poll that was not a secret ballot, scientists may have tended to answer in some way matching perceived conventions, to avoid getting in trouble by stating some opinion contrary to the supposed majority opinion in their field.

The study's statement about the polling of neuroscientist has an inconsistent sound to it. We read this:

"As a reference against which to compare the public's responses, 270 regular members of the Society for Neuroscience were consulted via e-mail, with an electronic, English version of the same questionnaire. A total of 2193 filled-in questionnaires were collected, 35 of which were from senior neuroscientists of different nationalities."

But how could 2193 questionnaires be returned, when only 270 were polled? The numbers given here don't sound right.

The poll gives some evidence that many neuroscientists do not hold the opinions commonly attributed to them. Asked whether they agree with the claim that "memory is stored in the brain much like in a computer, that is, each remembrance goes in a tiny piece of the brain," 82% answered "No," 12% answered "Don't know," and only 6% answered "Yes." 9% answered "Don't know" when asked whether they agree "the mind is a product of the working of the brain." When asked whether they agree with the statement "memory is stored in a net of many cells scattered throughout the brain," 77% said "Yes," 9% said "No," and 14% said "Don't know." When asked whether "'State of mind' is a reflection of the brain state in a given moment," 77% said "Yes," 3% said "No," and 20% said "Don't know." When asked whether they agree with the claim "Without a brain, consciousness is not possible," 83% answered "Yes," 6% answered "No," and 11% answered "Don't know." When asked whether they agreed with the claim "the mind is the result of the action of the spirit, or of the soul, on the brain," 35% answered "Don't know."

Although very limited as evidence for what neuroscientists are thinking (with answers from only 35 senior neuroscientists), this poll is sufficient to show that the beliefs conventionally attributed to neuroscientists are not held by all or almost all neuroscientists. In general, we lack reliable data on what neuroscientists believe. There seem to be no studies that perform (using scientific polling practices) a secret ballot of neuroscientists asking how much they agree with the beliefs commonly attributed to neuroscientists. So people should not be talking about a "consensus of neuroscientists" regarding the cause of mind or the storage place of memory, particularly since the term "consensus" suggests a unanimity that does not exist.

Let us consider a very interesting type of alleged consensus that I may call a "leader's new clothes" consensus. Let us imagine a small company of about 20 employees that has a weekly employee meeting every Monday morning. On one Monday morning after all the employees have gathered in a conference room for the meeting, the company's leader comes in wearing flashy new clothes that are both very ugly and ridiculous-looking. Immediately the leader says, "I just paid $900 for this new outfit -- raise your hand if you think I look great in these clothes."

Now if it is known that the leader is someone who can get angry and fire people for slight offenses, it is quite possible that all twenty of the employees might raise their hand in such a situation, even though not one single one of them believes that the leader looks good in his ugly new clothes. In such a case the "public consensus" is 100% different from the private consensus. A secret ballot would have revealed the discrepancy.

The point of this example is that appeals to some alleged public consensus are notoriously unreliable. So arguing from some alleged consensus of some group is a weak and unreliable form of reasoning. The only way to get a reliable measure of the opinion of people on something is to do a secret ballot, and there virtually never occurs secret ballots of scientists asking about their opinions on scientific matters. We have no idea of whether the private beliefs of scientists differ very much from the public facade they present. For example, we have no idea whether it is actually true that almost all scientists think your mind is merely the product of your brain. It could easily be that 35% of them doubt such a doctrine, but speak differently in public for the sake of "fitting in," avoiding "heresy trouble" and seeming to conform to the perceived norms of their social group.

Two very simple rules scientists should follow are (1) don't claim you understand something that you don't understand; (2) don't claim or insinuate that scientists all agree on something when you lack any good evidence that such agreement exists. Nature is very, very complex, and gives up its secrets very, very slowly, often eventually making knowledge boasts of scientists look ridiculous.

For more on this topic, see my post here, entitled "Exaggerations Abound When People Talk About a Scientific Consensus."

at August 14, 2022 No comments:

Labels: scientific consensus

Sunday, August 7, 2022

They're Calling It a Huge Memory Research Fraud, But Is It Only the Tip of the Iceberg?

If you do a Google search using the phrase "memory research fraud," you will now get many recent results from leading news sources, including results such as these:

- What allegations of Alzheimer's research fraud mean for patients
- Whistleblower Lifts the Lid on “False” Alzheimer's Research

- Research Fraud Bombshell Threatens Amyloid Theory of Alzheimer's Disease
- Decades Of Alzheimer’s Research Could Be Based On Fraudulent Data
- DECADES OF ALZHEIMER'S RESEARCH ALLEGEDLY BASED ON FABRICATED DATA

The leading journal *Science* did a big six-month investigation resulting in a recent long article entitled "Blots on a Field?" We hear claims of doctored images and fake visuals. An interesting part of the story is where the journal *Science* reaches out to leading science journals that have allegedly published some fake research, such as *Nature* and the *Journal of Neuroscience*, getting a lot of "no comments" from such journals.

We read this in one news article:

"Dr Bik has now identified 14 other studies...that also appear suspicious. Despite this, in the majority of cases, no action has been taken against the journals that published them. The University of Minnesota declined a request to comment by The Mail on Sunday...Richard Smith, a former editor-in-chief of the British Medical Journal (BMJ), who has warned that research fraud is a ‘major threat to public health’, said that the case was ‘shocking but not surprising’. He cites research that suggests up to one in five of the estimated two million medical studies published each year could contain invented or plagiarised results, details of patients who never existed and trials that did not actually take place. He adds the problem is ‘well known about’ in science circles, yet there is a reluctance within the establishment to accept the scale of the problem."

The same Dr. Bik is quoted as saying, "’I've flagged more than 6,000 studies as potentially fraudulent, but just one in six have been retracted by publishers." Later in the same article we read this:

"At present there are no drugs that can fight Alzheimer’s. The first company to invent one would no doubt have a billion-dollar blockbuster on its hands – and this, says Adrian Heilbut, has incentivised misconduct."

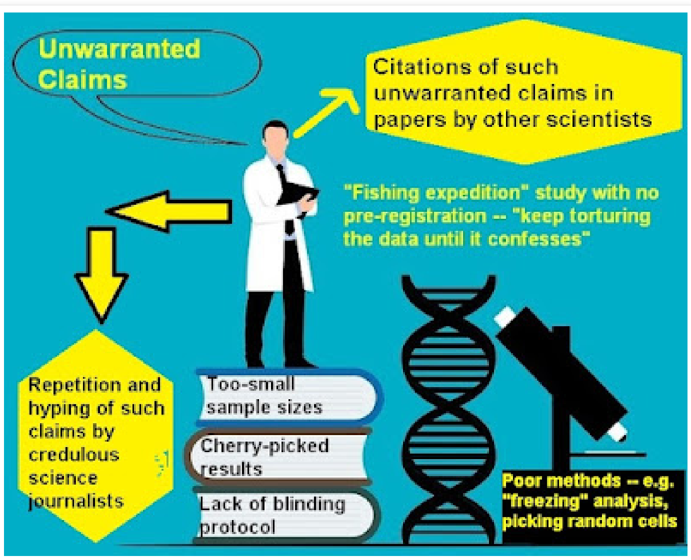
We can imagine part of the motivation here:
(1) Invest money in company XYZ.
(2) Do a "fair means or foul" paper suggesting that company XYZ's approach towards treating Alzheimer's is promising.
(3) Watch your stock shares soar in value.

The items discussed above are only "the tip of the iceberg." The problem in memory research is ten times worse than the mere problem of some researchers doing image doctoring to produce fraudulent images. The problem that is ten times worse involves things like this:

(1) Scientific papers are routinely stating claims in their titles and abstracts that are not well-established by any observations reported in the papers.
(2) Such unfounded claims are being massively repeated in the uncritical "echo chamber" that is the mainstream press and body of web sites calling themselves "science news" sites.

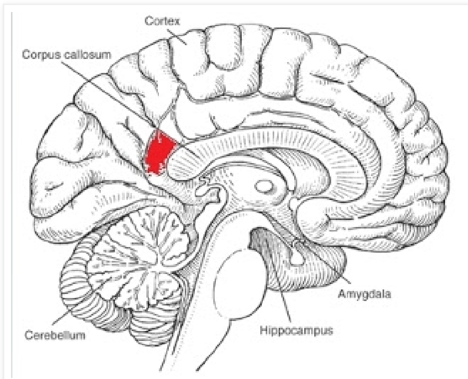
(3) Scientists doing experiments involving memory typically use study group sizes that are too small to produce any reliable result. The results are mainly false alarms of a type that can easily arise when too-small study group sizes are used.
(4) Scientists doing experiments involving memory typically fail to do the sample size calculations that would alert them that the study group sizes they are using are way too small to produce a reliable result.
(5) Scientists doing experiments involving memory are very often using defective experimental procedures that produce unreliable results, such as trying to measure fear in rodents by subjectively judging "freezing behavior" rather than using better procedures producing more reliable results, such as trying to measure fear in rodents by measuring heart rate (which reliably spikes very sharply when a rodent is afraid).
(6) Scientists doing experiments involving memory routinely fail to follow a blinding protocol that would reduce the chance of them producing false-alarm results in which they merely "see what they want to see."
(7) Scientists doing experiments involving memory routinely fail to follow good practices by pre-registering an exact experimental method for collecting and analyzing data. Often their papers show strong signs of "keep torturing the data until it confesses," which can also be described as "keep slicing and dicing the data until you find something like you hoped to find."

The diagram below illustrates some of what is going on. The "picking random cells" refers to memory experiments in which some learning occurs, and then scientists attempt to show neural changes resulting from learning after randomly picking some cells for analysis, ignoring the extreme improbability that randomly selected cells would have changed because of such learning. Because of constant remodeling and molecular turnover occurring theoughout the brain, randomly selected cells or synapses will be likely to show changes that were not produced by learning.

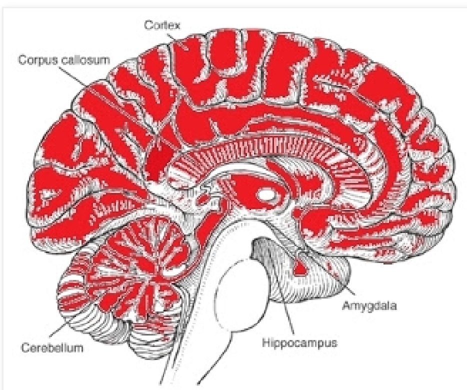


The links at the top of this blog refer to a scandal involving misleading images in neuroscience papers. Something similar has gone on endless times in brain imaging studies on the neural correlates of consciousness. Again and again, such studies will show visuals that depict differences of only 1% or smaller between brain activity in different small regions of the brain. But such regions will be shown as red regions in brain images, with all of the other areas having a grayish “black and white” color. When you see such an image, you inevitably get the impression that the highlighted part of the brain has much higher activity than other regions. But such a conclusion is not what the data is showing.

So, for example, a study finding merely 1% higher brain activity in a region near the corpus callosum (under some activity that we may call Activity X) might release a very misleading image looking like the image below, in which the area of 1% greater activity is colored in red.

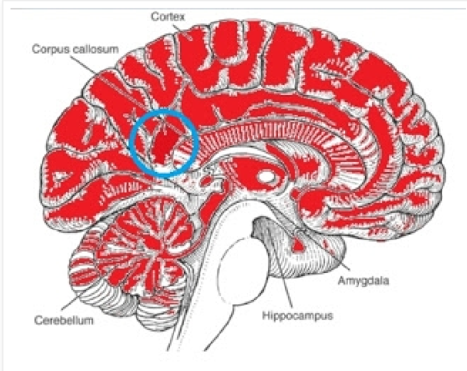


But such an image is lying with colors. If there is only a 1% greater activity in this region, an honest diagram would look like the one below.



With this diagram, the same region shown in red in the first diagram is shown as only 1% darker. You can't actually tell by looking at the diagram which region has the 1% greater activity when Activity X occurs. But that's no problem. The diagram above leaves the reader with the correct story: none of the brain regions differ in activity by more than 1% when Activity X occurs. Contrast this with the first image, which creates the very misleading idea that one part of the brain is much more active than the others when Activity X occurs.

You might complain that with such a visual, you cannot tell which regions have the slightly greater activity. But there are various ways to highlight particular regions of a brain visual, such as circling, pointing arrows, outlining, and so forth. For example, the following shows a region of very slightly higher activity without misleading the viewer by creating the impression of much higher activity:



The misleading diagrams of brain imaging studies seem all the more appalling when you consider that the images in such studies are typically the only thing that laymen use to form an opinion about localization in the brain. The text of brain imaging studies is typically written in thick jargon that only a neuroscientist can understand. Frustrated by this very hard-to-understand jargon and unclear writing, every layman reading these studies forms his opinions based on the visuals. When such visuals deceive us by lying with colors (as they so often do), it is a scandal of visual misrepresentation as great as whatever is discussed in the links at the top of this post.

at August 07, 2022 No comments:

Labels: fraud, scientist misconduct

Sunday, July 31, 2022

Why Plasticity and Neurogenesis Fail to Explain Minds That Work Well After Massive Brain Tissue Loss

The web site *The Conversation* (www.theconversation.com) has a "Science and Technology" tab where we often are given very bad explanations for things. A particularly witless example was a recent article entitled "What really drives anti-abortion beliefs? Research suggests it's a matter of sexual strategies." We were then given one of the many very silly work products of evolutionary psychology, something with a long history of providing groundless speculative explanations given a little scientific flavoring by some sprinkling of Darwinist verbiage. The speculation given (centered around the groundless idea that "sexually restricted people benefit from increasing the costs of sex") has no basis in either observation, logic or evolutionary theory.

Another "bad explanation" article on *The Conversation* site attempts to address why people are skeptical of some claims of scientists. We read no mention of things such as the replication crisis, that an apparent majority of findings in scientific papers fail attempts to experimentally replicate them. Instead we read this:

"How can scientists increase their credibility? ... To increase trustworthiness, they can convey that their work is motivated by selfless goals."

This claim is very funny. Scientists work for salaries. The more papers they publish, and the more such papers are read and cited, the higher is the chance that a scientist will move up some career path that may lead from being a mere "reader" or adjunct professor or assistant professor to being a better-paid full professor with tenure. The ultimate career goal of a scientist is to become a famous professor, who makes lots of money by writing books that are widely read. The work of scientists is not mainly motivated by selfless goals.

By contrast, consider a person such as myself. All of my blogs are free for anyone to read. I also have various books that you can access from my site www.markmahin.com or by using the link here. All of the books on those two pages can be read online for free. I have a Creative Commons license on all of my blogs, under which anyone can reproduce any of my posts for free, on any web site they have or any book they are publishing. I have never made a penny from my blogging or photographic activities, and a few occasional dollars I get from them is canceled out by my photographic expenses, which have been in excess of $2000. I take no contributions, and get no ad revenue. So when you read any of my posts, you can be sure that what I was writing or photographing was in no way motivated by money.

Another "bad explanation" article on *The Conversation* website attempts to answer a different question. The article has this long title: "Game of Thrones star Emilia Clarke is missing ‘quite a bit’ of her brain. How can people survive and thrive after brain injury?" We read that the talented actress Emilia Clarke had surgery removing significant portions of her brain, which occurred before she filmed most of the years of work she did on that show.

This is not at all the most dramatic example of people functioning well despite major loss of brain tissue. Other more dramatic examples include:

(1) Many cases of epilepsy patients who were suffering from seizures so bad that they had half of their brains surgically removed, in an operation called a hemispherectomy.

(2) Some split-brain patients who had their epilepsy treated by severing the fibers (called the corpus callosum) that connects the two hemispheres of the brain.

(3) Many patients who lost the great majority of their brain tissue through diseases such as hydrocephalus, which slowly converts brain tissue to watery fluid.

Contrary to claims that the mind is produced by the brain and that memories are stored in the brain, such massive loss of brain tissue often produces little change in memory or mental capacity. My post "Preservation of Mind and Memories After Removal of Half a Brain" (which you can read here) describes cases in which removing half of a brain had no major effect on either mind or memory. For example, here is a quote from the American Journal of Psychology, Vol. 46, No. 3 (Jul., 1934), pages 500-503, regarding work by a physician named Dandy:

"*Dandy has completely removed the right cerebral hemisphere from eight patients....**Later examinations showed no observable mental changes. The patients were perfectly oriented in respect of time, place, and person; their memory was unimpaired for immediate and remote events; conversation was always coherent; ability to read, write, compute, and learn new material was unaltered.** Current events were followed with normal interest. There were no personality changes apparent; the patients were emotionally stable, without fears, delusions, hallucinations, expansive ideas or obsessions, and with a good sense of humor; they joked frequently. They showed a natural interest in their condition and future. They cooperated intelligently at all times throughout post-operative care and subsequent testing of function."*

A 1966 paper was entitled "Long-term changes in intellect and behavior after hemispherectomy." The paper refers to operations in which half of a brain is removed, often to stop very bad brain seizures. This paper gives very detailed "before and after" IQ score data on 11 people who had half of their brains removed. Eight of the 11 people had the left half of their brain removed, and the other three had the right half of their brain removed. Every single one of the 11 people was able to get an improved IQ score on at least one of the tests taken *after* half of their brain was removed, a score better than a corresponding score they had got before half of their brain was removed. Patient 1 (a P.G.) had an IQ of 128 before half of his brain was removed. After half of his brain was removed, he scored 142 on an IQ test.

This result should not come as any surprise to anyone familiar with the research of the physician John Lorber. Lorber studied many human patients with hydrocephalus, in which healthy brain tissue is gradually replaced by a watery fluid. Lorber's research is described in this interesting scientific paper. A mathematics student with an IQ of 130 and a verbal IQ of 140 was found to have "virtually no brain." His vision was apparently perfect except for a refraction error, even though he had no visual cortex (the part of the brain involved in sight perception). In the paper we are told that of about 16 patients Lorber classified as having extreme hydrocephalus (with 90% of the area inside the cranium replaced with spinal fluid), half of them had an IQ of 100 or more.

The article in *The Conversation* does not mention such cases. But using the example of Emilia Clarke (who performed skillfully as an actress after apparently losing quite a bit of her brain because of brain surgery), the neuroscientist author of the article (Professor Anthony Hannan) offers two explanations for why minds would perform well after massive loss of brain tissue: "neural plasticity" and neurogenesis.

Let's look at whether either of these explanations is a strong one.

Poor Explanation #1: Neural Plasticity

To explain the phrase "neural plasticity" I should first start by explaining the simpler term "synaptic plasticity." The term "synaptic plasticity" has long been used by those who claim that memories are stored in synapses. It has often been claimed that when a memory is created, some synapses kind of mold themselves to store the memory. Those advancing this claim would sometimes claim that synapses are molded by experience or sensory experience rather as some clay can be molded by an artist.

There has never been any robust evidence to support such claims. Instead of having evidence for memory formation by synaptic plasticity, we merely have evidence for constant remodeling and physical turnover in synapses. All synapses can be very roughly compared to the wet sand at the edge of the seashore, which is constantly remodeled by the action of the tides. What often goes on in neuroscience studies is that after some animal learns something, a neuroscientist will look at some synapses, and see some evidence of change. The neuroscientist will often claim that the change resulted from the learning that occurred. The fallacy in such work is that all synapses in the brain are constantly changing, regardless of whether anything is learned. So the mere observation of a change in some synapses does nothing to show that such change occurred because of something that an organism learned.

The constant remodeling of synapses occurs largely because of the short lifetimes of synapse proteins. Synapses are made of proteins that have average lifetimes of two weeks or less. Such short lifetimes make an extremely strong reason for disbelieving claims that memories are stored in synapses. Human memories often last 1000 times longer than the average lifetime of synapse proteins. But despite the lack of good evidence for claims that memories are stored in synapses, neuroscientists love to use the vague term "synaptic plasticity." The type of evidence cited for synaptic plasticity is usually just evidence for synaptic instability all over the brain.

The term "neural plasticity" is a term similar to the term "synaptic plasticity." Neural plasticity is some alleged ability of the brain to rewire itself. Connections between brain cells are constantly being built and broken down, just as vines between trees are constantly being built and decaying in the dense regions of the Amazon rain forest.

However, there is no evidence that brains can rebuild themselves the way the liver can. A page at the NIH describes that ability of the liver:

"The liver has a unique capacity among organs to regenerate itself after damage. A liver can regrow to a normal size even after up to 90% of it has been removed."

But the brain has no such ability to regenerate itself. If you take out a part of the brain, it remains lost. When half of the brain is removed in a hemispherectomy operation to stop very bad seizures, the brain does not regenerate the missing half. When a quarter or an eighth of the brain is removed to get rid of a cancerous tumor, the brain does not grow back the missing part.

Professor Hannan makes this misleading claim: "The key to understanding how brains can recover from trauma is that they are fantastically plastic – meaning our body’s supercomputer can reshape and remodel itself." The brain is not a computer, and the brain lacks seven characteristics of information-storage devices such as computers, as I point out in my post "Seven Things in Fast Retrieval Systems, None of Which Your Brain Has." There is no evidence that brains reshape themselves or remodel themselves in any way that can explain the preservation of mental abilities after loss of large parts of the brain. Evidence typically given for neural plasticity or synaptic plasticity should really be described instead as evidence for *mental resiliency,* the ability of the mind to keep functioning well despite brain damage.

Much of what Professor Hannan says to back up his claims are unproven and easy-to-discredit claims about brains storing memories. He provides no evidence at all that the brain generates very many more synapses or neurons to make up for synapses or neurons that were lost. About the best that he can do is to make this claim (which he does not support with specifics):

"With brain injury, the changes can be bigger; you get certain rewiring around the injury. These synapses can rearrange themselves to work around the damaged part."

Poor Explanation #2: Neurogenesis

The second thing Professor Hannan attempts to do to explain well-functioning minds after massive brain damage is to appeal to what he calls neurogenesis: the ability of a brain to make new brain cells. He says this:

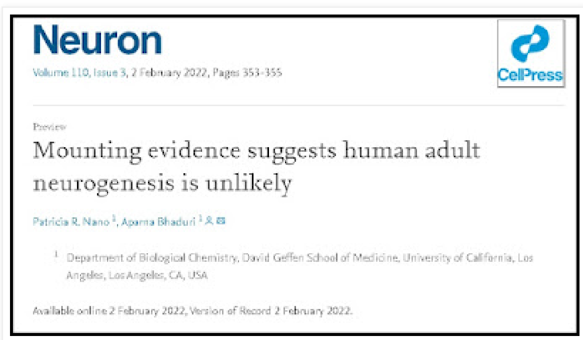
"But there's another form of plasticity called neurogenesis. This involves little pockets in the brain where new neurons continue to be born throughout life. And there's evidence that after brain injury these neural stem cells can be stimulated and migrate to the area of injury and make new neurons."

Unfortunately, the evidence for adult neurogenesis is very weak. Attempts to observe neurogenesis produce conflicting results. Many neuroscientists believe that human adults do not generate new brain cells in significant numbers. Even those who argue for neurogenesis claim numbers of new neurons through neurogenesis so low that they cannot appreciably explain the persistence of human mental abilities despite massive loss of brain tissue.

A 2019 paper says this about adult neurogenesis (the formation of new neurons):

"Here we examine the evidence for adult human neurogenesis and note important limitations of the methodologies used to study it. A balanced review of the literature and evaluation of the data indicate that adult neurogenesis in human brain is improbable. In fact, in several high quality recent studies in adult human brain, unlike in adult brains of other species, neurogenesis was not detectable."

Below we see a recent paper with a title of "Mounting evidence suggests human adult neurogenesis is unlikely."


Neuron

Volume 110, Issue 3, 2 February 2022, Pages 353-355

CellPress

Preview

Mounting evidence suggests human adult neurogenesis is unlikely

Patricia R. Nano [1], Aparna Bhaduri [1]

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Available online 2 February 2022, Version of Record 2 February 2022.

Even those who believe in adult neurogenesis claim that it produces a relatively small amount of neurons: only about one or two thousand per day. That is smaller than the number of brain cells that die each day. We don't know exactly how many brain cells die each day, but it has been estimated that adults lose roughly 10,000 brain cells per day. So neurogenesis is worthless for explaining minds that work well after massive brain tissue loss. Any gain produced by neurogenesis does not even make up for all the neurons being lost due to regular aging.

In the poll here of 90+ neuroscientists, neuroscientists were asked whether they agreed with a series of statements. One of the statements was, "Damaged portions of the human brain regenerate and get well again." 88% of the neuroscientists disagreed with that statement. The story line of a self-healing brain that Hannon is insinuating does not match the opinions of the vast majority of neuroscientists. Also 56% of the neuroscientists agreed with the statement, "The human brain stops growing at the end of adolescence," just as if they did not believe in substantial adult neurogenesis.

Nothing that Hannan mentions has any value in explaining the preservation of old memories and old learning despite massive loss of brain tissue. If you still remember something you should have forgot after losing half your brain, that cannot be explained through any explanation such as growing new synapses or new neurons. Such new synapses or new neurons would not have the information allegedly stored in the old synapses and neurons that had been surgically removed.

So neuroscientists such as Hannan have no credible explanation to offer as to why human minds should continue to perform so well after massive loss of brain tissue. There is only one credible way to explain this paradox: by postulating that the brain does not produce the mind, and that the brain is not the storage place of memories.

at July 31, 2022 No comments:

Labels: adult neurogenesis

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Head Truth

The huge case for thinking minds do not come from brains

Sunday, July 24, 2022

"Brain Chemical Imbalance" Theory Is Fading Out as an Explanation for Mental Illness

An interesting exercise is to try the following Google query:

What causes mental illness?

Let us look at the extremely diverse results that come up on the first page of search results that appear when we do such a Google query. Strangely, the first result is an article that does not make any attempt at all to suggest any explanation for a cause of mental illness. The second search result is a page from a small organization that states this:

"Most psychiatric survivors reject the term 'mental illness' altogether, as it supports what is considered the 'medical model' of mental health. The medical model is based on the idea that there is a physiological impairment creating a neurochemical imbalance in a person's brain, resulting in a mental illness. Despite this popular perspective, it is based on flawed science."

The third result is a page that does not make any attempt at all to suggest any explanation for a cause of mental illness. The fourth result is a page that attempts to explain mental illness by first mentioning genetics. The page suggest that there might one day be some kind of genetic or epigenetic way of reducing suicide. The page suggests that "macrophages" and "inflammation" somehow contribute to mental illness.

The fifth search result is a page from a leading medical clinic, the Mayo Clinic. In a section entitled "Causes," the page lists three causes for mental illness: "Inherited traits," "Environmental exposures before birth," and "Brain chemistry." What the page suggests under "brain chemistry" is basically the same idea that is rejected by the second search result (on this page).

(I may note that after years in which the medical community kept telling us that mental illness is caused by imbalances of brain chemicals, we now have many authorities who are denying such claims. Such authorities sometimes claim that the medical establishment never taught that mental illness is caused by imbalances of brain chemicals. But the doctrine of mental illness being caused by brain chemical imbalances still is taught very widely by many medical authorities, and evidence of the massive teaching of the doctrine by the medical and neuroscience establishment can effortlessly be found very abundantly by searching for the past statements of such authorities.)

The sixth search result is a page entitled "What causes mental illness?" The answers suggested (from first to last) are genetics, environment, childhood

Total Pageviews

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trauma, stressful events, negative thoughts, unhealthy habits, drugs and alchohol, and brain chemistry. The page tells us this: "Mental illness involves an imbalance of natural chemicals in your brain and your body." This is the "chemical imbalance" theory of mental illness that numerous authorities are now saying is not true, and which some authorities are claiming was never taught. It very obviously was taught and continues to be taught by leading authorities.

The seventh search result is a page from the widely read WebMD site. The page suggests the "chemical imbalance" theory of mental illness, along with a widely spread "bad wiring" theory. The page also suggests causes of genetics, infections, brain defects or injury, and substance abuse. The page also mentions "stressor" events such as death or divorce, changing jobs, feelings of inadequacy and a dysfunctional family life. The page kind of goes "all over the map" in trying to explain the causes of mental illness.

The eighth search result is a 2012 page on the site of the American Psychological Association, one entitled "The Roots of Mental Illness." At first the page starts out by pitching purely biological causes of mental illness. We read this:

"Eric Kandel, MD, a Nobel Prize laureate and professor of brain science at Columbia University, believes it's all about biology. 'All mental processes are brain processes, and therefore all disorders of mental functioning are biological diseases,' he says. 'The brain is the organ of the mind. Where else could [mental illness] be if not in the brain?' "

We certainly do not know that all or even most mental processes are brain processes, and there are very strong reasons (discussed on this blog) for rejecting claims that all or most mental processes are brain processes, a claim which is dogma, not fact. As for the "where else" reasoning of Kandel, it is a type of rhetorical question sophistry that can sound convincing only because of the lack of imagination in the person hearing it. The same type of fallacious reasoning was long used about DNA. People would say that DNA must contain some blueprint for making a human, arguing, "Where else could such a blueprint be?" The fact is no such blueprint has ever been discovered in DNA, which contains only low-level chemical information, not high-level structural information. We can reasonably answer Kandel's question like this: mental illness (along with most other mental phenomena such as memory) could be in some non-material reality of a human (such as a soul) that is something different from the brain.

Next on the 2012 "Roots of Mental Illness" page of the American Psychological Society, we read this: "That viewpoint is quickly gaining supporters, thanks in part to Thomas R. Insel, MD, director of the National Institute of Mental Health, who has championed a biological perspective during his tenure at the agency." But a mental health expert claimed in a recent interview that Insel's "13 years in charge of the nation's mental health research produced such uniformly dismal results." The expert stated this, quoting Insel:

"When Insel stepped down as director of NIMH in 2015 he gave an interview about his accomplishments, after spending by his estimate $20 billion. 'I spent 13 years at NIMH really pushing on the neuroscience and genetics of mental disorders, and when I look back on that ... I don't think we moved the needle in reducing suicide, reducing hospitalizations, improving recovery for the tens of millions of people who have mental illness.' "

- A Soul Might Explain Instincts, but DNA and Brains Cannot
- Five Hallmarks of an Information Storage System (None of Which Your Synapses Have)
- Your Physical Structure Did Not Arise Bottom-Up, So Why Think Your Mind Did?
- Why a "Mechanical Memory" Theory Does Not Work
- The Brain Seems to Have No Mechanism for Reading or Writing Memories
- No One Understands How a Brain Could Generate Ideas
- Prevailing Brain Dogmas Cannot Explain Hypnotic Phenomena
- 30 Reasons for Rejecting the Theory of Neural Memory Storage
- Common Experiences That Show the Untruth of Professorial Memory Claims
- Neuroscience Research Customs Guarantee an Abundance of Junk Science
- Groupthink and Peer Pressure Make It Taboo for Neuroscientists to Put Two and Two Together
- The Social Construction of Eager Community Mirages
- Preprint Server Counts Suggest Engrams Are Not Really Science
- Engrams Are Touted Like Phlogiston Was Once Touted
- Synaptic Delays Mean Brain Signals Must Move at a Snail's Pace
- Raven Smarts Defy Prevailing Brain Dogmas
- No One Can Credibly Explain Why a Brain Would Store a Memory in One Specific Spot
- Brain Dogmas Versus Case Histories That Refute Them
- Inaccurate Titles and Misleading Citations Are Common in Science Papers
- In Neuroscience Papers Bluffing Is More Common Than Candor
- Young Age of Languages Contradicts Claims of Neural Storage of Linguistic Information
- Vacillating Disarray of the Memory Trace Theorists
- Study Finds "Poor Overall Reliability" of Brain Scanning Studies
- "Brains Store Memories" Dogma Versus the Reality of Noisy Brains
- The Brain Has Nothing Like 7 Things a Computer Uses to Store and Retrieve Information

Indeed, in its second part the 2012 "Roots of Mental Illness" page of the American Psychological Society shifts gears, giving us this quote:

"That complexity is one reason that experts such as Jerome Wakefield, PhD, DSW, a professor of social work and psychiatry at New York University, believe that too much emphasis is being placed on the biology of mental illness at this point in our understanding of the brain. Decades of effort to understand the biology of mental disorders have uncovered clues, but those clues haven't translated to improvements in diagnosis or treatment, he believes. 'We've thrown tens of billions of dollars into trying to identify biomarkers and biological substrates for mental disorders,' Wakefield says. 'The fact is we've gotten very little out of all of that.' "

The ninth search result gives another "all over the map" smorgasbord of reasons for mental illness. In a similar vein, the tenth search result is a page of the Center for Disease Control. Under a heading of "What Causes Mental Illness?" we read the following:

"There is no single cause for mental illness. A number of factors can contribute to risk for mental illness, such as

- *Early adverse life experiences, such as trauma or a history of abuse (for example, child abuse, sexual assault, witnessing violence, etc.)*
- *Experiences related to other ongoing (chronic) medical conditions, such as cancer or diabetes*
- *Biological factors or chemical imbalances in the brain*
- *Use of alcohol or drugs*
- *Having feelings of loneliness or isolation"*

The eleventh search result is a page that offers an extremely wide range of things that can affect mental health:

"

- *childhood abuse, trauma, or neglect*
- *social isolation or loneliness*
- *experiencing discrimination and stigma, including racism*
- *social disadvantage, poverty or debt*
- *bereavement (losing someone close to you)*
- *severe or long-term stress*
- *having a long-term physical health condition*
- *unemployment or losing your job*
- *homelessness or poor housing*
- *being a long-term carer for someone*
- *drug and alcohol misuse*
- *domestic violence, bullying or other abuse as an adult*
- *significant trauma as an adult, such as military combat, being involved in a serious incident in which you feared for your life, or being the victim of a violent crime*
- *physical causes – for example, a head injury or a neurological condition such as epilepsy can have an impact on your behaviour and mood. (It's important to rule out potential physical causes before seeking further treatment for a mental health problem)."*

The page rejects the "brain chemistry imbalance" so often advanced around the turn of the century, stating the following:

"The human brain is extremely complicated. Some research suggests that mental health problems may be linked to a variation in certain brain chemicals (such as serotonin and dopamine), but no one really understands how or why. Arguments that someone's brain chemistry is the cause of mental health problems are very weak. But even though there's no strong evidence to say that any mental health problems are caused by a chemical imbalance in our brains, you might find some people still use brain chemistry to explain them."

The 12th search result also suggests a wide range of causes for mental illness. The 13th search result is a World Health Organization page that does not attempt to describe the causes of mental illness. The 14th search result is a National Institute of Mental Health page that also does not attempt to describe the causes of mental illness.

From these results it seems we can draw three conclusions:
(1) The claim that mental illness is caused by brain chemical imbalances is a claim that is still being pushed here and there by various authorities.
(2) Such a claim is now disputed by many other authorities on mental illness, who say that there is no robust evidence for such a claim that mental illness is caused by chemical imbalances in the brain.
(3) The most common answer given regarding the cause of mental illness is a multi-factor answer that mentions a wide variety of possible causes, many of which include things other than brain states.

There was never any good evidence for the theory that mental illnesses are caused by brain chemical imbalances. The theory was popular largely because it was pushed by pharmaceutical companies. Neuroscientists often sounded supportive of the theory partially because many of them are financially entangled with pharmaceutical companies.

A recent article on the Psychology Today web site is an illuminating expose of how doctors, professors and pharmaceutical companies long pushed an unwarranted theory that depression is caused by a chemical imbalance, an imbalance of the chemical serotonin. The article tells us that the theory was so widely spread by authorities that more than 80% of the public believed it, according to polls. We read this:

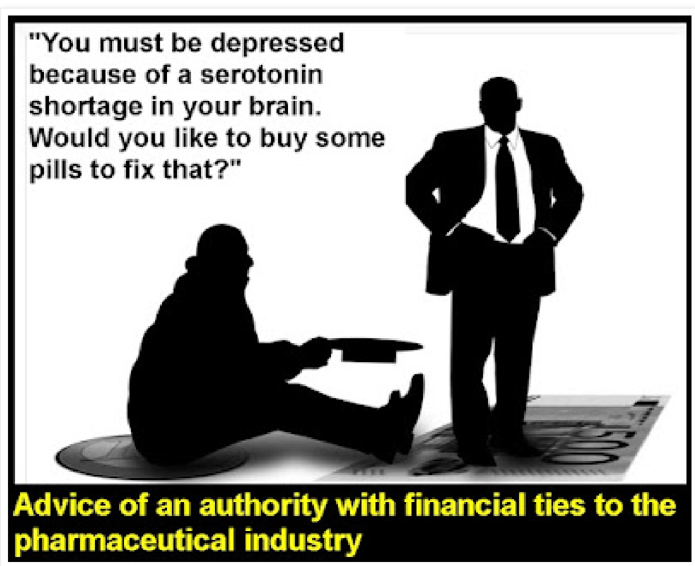
"A major new review of the research—the first of its kind exhaustively reviewing the evidence, published today in the journal Molecular Psychiatry—reaches a strikingly similar conclusion. In 'The Serotonin Theory of Depression: A Systematic Umbrella Review of the Evidence,' University College London Psychiatry Professor Joanna Moncrieff and a team of five other top European researchers found 'there is no evidence of a connection between reduced serotonin levels or activity and depression.' …The researchers also looked at studies where serotonin levels had been 'artificially lowered in hundreds of people' (by depriving their diets of the necessary amino acid that makes serotonin) and found that 'lowering serotonin in this way did not produce depression in hundreds of healthy volunteers,' according to a 2007 meta-analysis and several recent studies. Numerous other reviews on re-examination were found to provide

weak, inconsistent, or nonexistent evidence of a connection between serotonin and depression."

It was the same thing going on in regard to the serotonin theory of depression and the theory that the brain is the source of the human mind and the storage place of memories:

- In both cases a community of experts became a belief community with the goal of propagating some dubious explanation.
- In both cases an overconfident community of experts "jumped the gun" by claiming to understand things beyond its understanding.
- In both cases the community of experts developed speech customs that were not based on sound scientific evidence, and were contrary to many observations.
- In both cases the story line being told served the vested interests of the experts, by helping to make them look like great lords of explanation who understood deep mysteries of the mind.

Just as our professors and psychiatrists misled us for so long with unfounded theories of mental illness being caused by chemical imbalances, professors and psychiatrists and neuroscientists have misled us for so long by advancing unfounded claims that human minds comes from brains and that brains are the storage place of memories. The social construction of the serotonin theory of depression is a sociology story very similar to the sociology story of the social construction of claims that brains make minds and store memories. To understand how and why such folklore began to be told, use a rule of "follow the money" and ask this again and again: "Who was it benefited by the telling of such stories, and in what ways did they benefit?" And also ask again and again: "In what ways did the tellers of such stories break the rules of proper scientific inquiry, in a way that led to their own benefit?"



When the oppressed are sad largely because they have been oppressed, it is very convenient to tell such people that they are sad because of some problem in their brain that can be fixed if they buy pills, rather than because of all of the things that society has done to oppress them. Part of this oppression comes from academia itself, but explaining how that works would require a separate post.

And speaking of errors about brains, today's Health page on Google News has a link to an article entitled "Two decades of Alzheimer's research may be based on deliberate fraud that has cost millions of lives."

Postscript: The post here documents how leading authorities long pushed the serotonin theory of depression, and how some of them are backtracking, changing their web sites and claiming they never really believed such a thing (often in contrast to their previous statements). At this page we read of a psychiatry professor who has been trying to stop using "anti-depression" SSRIs, through a very gradual reduction lasting years. We get the impression of some great hazard in suddenly stopping their use. But in the TV shows we never hear a psychiatrist say, "I'm going to put you on this pill, but it's pretty addictive." Claims that the serotonin theory of depression was a mere "urban legend" not taught by psychiatrists and neuroscientists are debunked in a scientific paper entitled "Is the chemical imbalance an 'urban legend'? An exploration of the status of the serotonin theory of depression in the scientific literature." That paper documents that very many psychiatrists and neuroscientists taught such a theory for decades, before beginning to backtrack around 2022.

at July 24, 2022 1 comment:

Labels: depression, mental illness, psychiatry

Sunday, July 17, 2022

Evolution Does Not Explain DNA, DNA Does Not Explain Bodies, and Bodies Do Not Explain Minds

Here (in a simple sketch) is a view of biological origins that has been repeatedly taught or suggested by biologists (although quite a few biologists have disputed some parts of it):

(1) "Evolution (a random, unguided process) has produced the DNA of each species, which consists mainly of units called genes."

(2) "Each gene in DNA specifies how to make a particular type of protein molecule in an organism."

(3) "An organism's DNA thereby explains why each organism has the body that it has."

(4) "Part of an organism's body (its brain) is the cause of any mind that the organism may have, and the storage place of the organism's memories."

The doctrine above can be condensed into a single sentence. The doctrine above is the teaching that evolution explains DNA, DNA explains bodies, and bodies explain minds. There are very strong reasons for rejecting each part of this doctrine.

Evolution Does Not Explain DNA

First, let us look at reasons why it is not credible to maintain that evolution can explain DNA. The first reason is that evolutionary theory has no credible explanation for the origin of the DNA molecule itself and the biological infrastructure needed within a cell for a DNA molecule to be useful. This is the unsolved problem of the origin of life. Currently there is no evolutionary explanation for the origin of life, nor is there any credible natural explanation for the origin of DNA. Scientists have been struggling with this problem for many decades, and have made extremely little progress towards resolving it. The claimed progress that has been reported is basically all illusory progress (such as the matter discussed here).

Even the simplest self-reproducing cell represents a state of organization that we would never expect to arise by chance processes given a billion trillion planets on which random chemical reactions could occur. A recent report from scientists long attempting to estimate the simplest possible microbe is a report estimating that such a microbe would have 473 genes with 531,000 base pairs. This is information that all has to be exactly or almost exactly right for a cell to function properly and reproduce. The amount of fine-tuned functional information involved is roughly the same as the amount of fine-tuned functional information in a well-written 300-page instruction manual. Just as we would never expect a well-written 300-page instruction manual to arise by chance processes (even given a billion trillion planets for such accidental processes to occur), we would never expect all the required information in a self-reproducing cell to appear by chance.

We can't get around this difficulty by imagining a gradual evolutionary origin of the first life, because Darwinian evolution requires life of some kind (and biological reproduction) as a prerequisite before evolution can occur. The shortfall in evolutionary theory in regard to explaining life's beginning is shown by the fact that there are two main types of cells: prokaryotic cells (the simpler type) and the vastly more complex type of cells called eukaryotic cells; and nowadays biologists typically do not explain the origin of either one of these types of cells by evoking Darwinian evolution. To try to explain prokaryotic cells, biologists appeal to some fantastically lucky chance combination of molecules. To try to explain eukaryotic cells, biologists these days are appealing to some other fantastically lucky chance "endosymbiosis" event by which cells suddenly became vastly more complex by gobbling up less complex cells. Given that nowadays biologists are not trying to explain the origin of either of the two main types of cells by Darwinian evolution, it certainly is not true that the origin of the DNA molecule is explained by evolution.

Let me explain in the next several paragraphs another huge reason why evolution does not explain DNA. Each DNA molecule consists mainly of genes that specify which amino acids make up a particular protein molecule. Each gene largely specifies how to make one particular complex invention: a particular type of protein molecule. In the DNA of humans, for example, there are roughly 20,000 genes, each largely specifying how to make one of the 20,000+ types of protein molecules in the human body.

Protein molecules are sensitive, fragile things that do not function in half-forms or quarter forms. Just as a human body cannot live if you saw a man off at his navel, a protein molecule will not function in half-form. And just as there are many ways to kill a human by sawing off a quarter of less of his body, there are many ways to make a typical protein molecule nonfunctional by removing only a small fraction of the molecule. A biology textbook tells us, "Proteins are so precisely built that the change of even a few atoms in one amino acid can sometimes disrupt the structure of the whole molecule so severely that all function is lost." And we read on a science site, "Folded proteins are actually fragile structures, which can easily denature, or unfold." Another science site tells us, "Proteins are fragile molecules that are remarkably sensitive to changes in structure."

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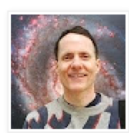

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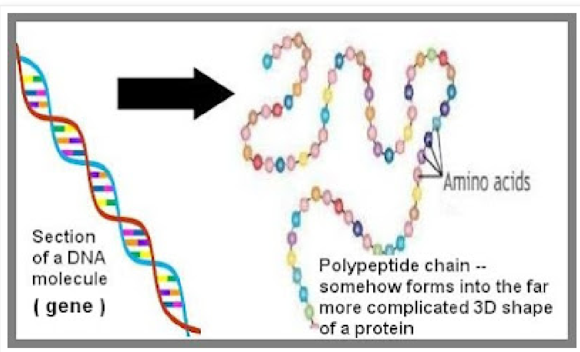
For example, the paper here estimates that making a random change in a single amino acid of a protein (most of which have hundreds of amino acids) will have a 34% chance of leading to a protein's "functional inactivation." Figure 1 of the paper here suggests something similar, by indicating that after about 10 random mutations (a change in only 10 of its hundreds of amino acids), the fitness of a protein molecule will drop to zero. Further evidence for such claims can be found in this paper, which discusses very many ways in which a random mutation in a gene for a protein molecule can destroy or damage the function or stability of the protein. An "active site" of an enzyme protein is a region of the protein molecule (about 10% to 20% of the volume of the molecule) which binds and undergoes a chemical reaction with some other molecule. The paper states, "If a mutation occurs in an active site, then it should be considered lethal since such substitution will affect critical components of the biological reaction, which, in turn, will alter the normal protein function." The paper follows that sentence with a mention of quite a few other ways in which random mutations can break protein molecules, making them nonfunctional. For example, we read that "an amino acid substitution at a critical folding position can prevent the forming of the folding nucleus, which makes the remainder of the structure rapidly condense," which is a description of how a single amino acid change (less than a 1% change in the amino acids in a protein molecule) can cause a protein molecule to no longer have the 3D shape needed for its function. As a biology textbook tells us, "Proteins are fragile, are often only on the brink of stability."



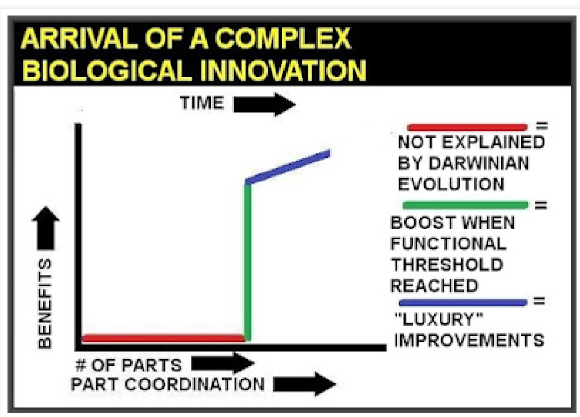
The median number of amino acids in a protein molecule is about 375. A gene is a set of hundreds of DNA nucleotide base pairs specifying or symbolizing hundreds of amino acids arranged in just the right way to match the amino acid arrangement in a functional protein molecule. There are twenty amino acids used by living things, just as there are 26 letters in the English alphabet. The probability of 375 random amino acids corresponding to a functional protein molecule is roughly comparable to the probability of 375 random characters being a functional English paragraph: a probability that is essentially zero. The table below shows some of the combinatorial mathematics involved. There are many human protein molecules that have more than 700 amino acids.

Number of amino acids in a molecule	Number of possible combinations of the molecule's amino acids
5	3200000
10	10240000000000
20	104857600000000000000000000
40	1.09951162777600E+052
80	1.20892581961463E+104
160	1.46150163733090E+208
320	2.1E+416
640	4.56E+832

2.1E+416 means 2 times 10 to the 416th power, more than 10 followed by 415 zeros

In general, with a few possible exceptions, there are no credible evolutionary accounts for the origin of the genes that are the most important parts of DNA. Because a protein molecule corresponding to a gene is not functional if only half of the protein molecule exists, there is no credible story to be told of the gradual origin of a gene because of some gradually improving protein molecule. Neither a gene nor its corresponding protein molecule will be functional until the great majority of its structure is in place.

The diagram below illustrates the point. A gene has a median number of nucleotide base-pair parts equal to about 375 (since 375 is the median number of amino acids in a protein molecule). But a gene will not be functional unless the great majority of these parts are in place in the correct arrangement. Such a minimal functionality requirement corresponds to the green line in the diagram below. To imagine a new gene arriving, we must imagine the lucky appearance of 250 or more parts arranged in just the right way to produce a functional effect. This would be a miracle of luck we would not expect to have happen by chance even once in the history of our planet, a miracle of luck very comparable in its improbability to typing monkeys producing a well-written useful functional paragraph of 250 characters or more.



Were such a miracle of luck required just once, the difficulty would not be so bad. But for us to believe random mutations produced the human genome, we must imagine many thousands of such miracles of luck. We cannot say we have an explanation for something when so many thousands of appeals are being made to miracles of luck. Clearly Darwinian evolution does not explain the information in our DNA. A few months ago a scientific paper by several scientists confessed, "Biological systems have evolved to amazingly complex states, yet we do not understand in general how evolution operates to generate increasing genetic and functional complexity."

September 2018 (1)
August 2018 (1)
July 2018 (1)
June 2018 (1)
April 2018 (30)

Labels

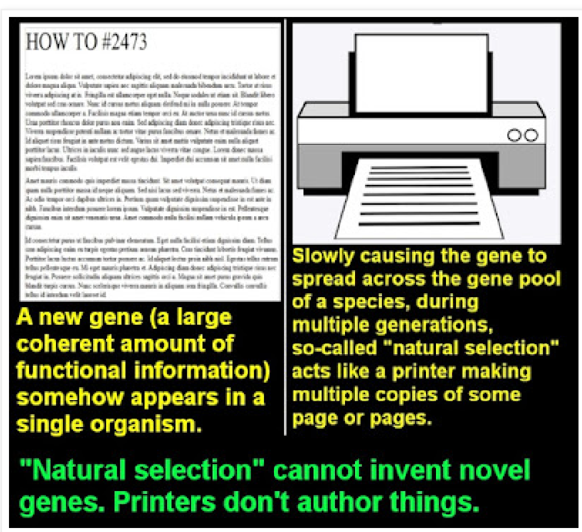
- "brain as computer" metaphor
- academia dysfunction
- adult neurogenesis
- AI
- binary memory storage theory
- brain changes with age
- brain connectivity
- brain effect on personality
- brain imaging
- brain injury
- brain research projects
- brain shortfalls
- brain signal speed
- brain surgery
- brain uploading
- brain waves
- claims of mind reading by brain scans
- claims of neural correlates of mental activity
- COVID-19
- decisions
- default mode network
- dendritic spines
- depression
- distributed recall hypothesis
- DNA
- EEG studies
- emergence
- epilepsy
- ESP
- evolution
- exceptional memory
- exceptional speed of thinking
- file drawer effect
- fraud
- free will
- genes
- global workspace theory
- groupthink
- health hazards in neuroscience experiments
- hemispherectomy
- high mental function despite large brain damage

So how did humans get in their DNA about 20,000 functional genes enabling humans to have 20,000+ different types of functional proteins, each serving a different purpose in the human body? Darwinian evolution does not credibly explain that. The issue is one that Darwin never understood, for in his time there was no understanding of the complexity of protein molecules, or the number of different types of protein molecules in the human body. Darwin thought that there are maybe twenty complex inventions in the human body, and he counted things like eyes and arms and legs as some of those. He had no idea that the number of complex inventions in the human body was a thousand times greater, since each different type of protein molecule is its own complex invention.

Evoking the not-literally-accurate term "natural selection" does not get you out of such difficulties. The term is not-literally-accurate because no real selection is involved (selection being a word meaning choice by a conscious agent). Because natural selection only acts on innovations that have already appeared, the concept of natural selection does not explain most biological innovations. A famous biologist (Hugo de Vries) told us the truth about the limited power of natural selection when he stated this:

"Natural selection is a sieve. It creates nothing, as is so often assumed; it only sifts."

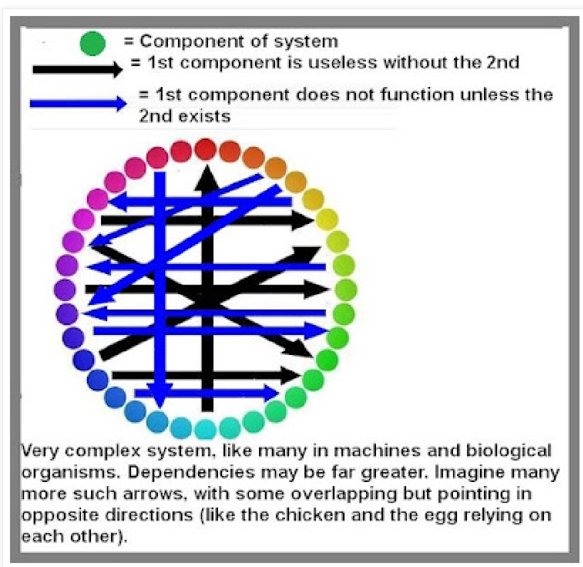
As a quick-and-dirty analogy, you can think of natural selection as a mere sieve or filter that preserves lucky results. But perhaps a better analogy is if we think of natural selection as being like a computer printer. Darwinists believe that a novel gene originates when some incredibly lucky random change occurs in a single organism, and that natural selection causes such a new gene to slowly spread across the gene pool of a species during multiple generations (because the gene produces a survival benefit or reproduction benefit, causing an organism that has it to be more likely to spread its genes). According to such a description, natural selection is acting like a computer printer that can make unlimited copies of some page or pages. But it is a gigantic mistake to think that we can explain the origin of the gene by appealing to natural selection. At best natural selection is like a computer printer, and computer printers don't author things.



Within the context of explaining the origin of novel genes and novel proteins, there is actually every reason to believe that the idea of natural selection is a very misleading one (beyond the mere fact that no real selection is occurring

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

because agent is choosing). Why is that? Natural selection is basically the idea that nature preserves some great miracle of biological luck when it occurs. But let us imagine that random mutations were to produce a novel innovation by accidentally making a new type of functional protein molecule. With 99.999% likelihood such a thing would not be preserved in a gene pool for many generations, for the simple reason that it would only be one element when many other miracles of protein innovation or phenotypic innovation would be needed to actually produce a survival benefit or a reproduction benefit. This is because the requirements for improvements in survival or reproduction are usually incredibly complicated, typically involving a requirement for quite a few coordinated and very complicated changes in different places. Such requirements are vastly underestimated by Darwinism enthusiasts who fail to study the gigantically diverse and complex requirements for successful biological improvements, which often involve multiple very complex "chicken or the egg" cross-dependencies. Just as inventing a CPU chip in 17th century France would not have got you anywhere (because countless other not-yet-invented things would also be needed for a computer), in general some accidental miracle of luck producing a functional new type of protein molecule would almost certainly be futile, because many other simultaneous (or nearly simultaneous) miracles of luck would be needed to produce a benefit in survival or reproduction.



Very complex system, like many in machines and biological organisms. Dependencies may be far greater. Imagine many more such arrows, with some overlapping but pointing in opposite directions (like the chicken and the egg relying on each other).

DNA is mainly a set of genes, each of which specifies the amino acid sequence of a particular type of protein. In this paper a Harvard scientist confessed, "A wide variety of protein structures exist in nature, however the evolutionary origins of this panoply of proteins remain unknown." That's right: evolution does not explain DNA.

DNA Does Not Explain Bodies

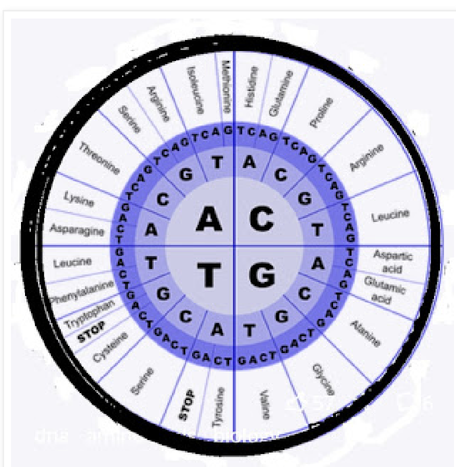
Not long after DNA was discovered about the middle of the twentieth century, scientists and science writers began spreading a false idea about DNA: the idea that DNA contains a specification for building an organism. There are various ways in which this false idea is stated, all equally false:

- Many described DNA or the genome as a blueprint for an organism.

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

- Many said DNA or the genome is a recipe for making an organism.
- Many said DNA or the genome is a program for building an organism, making an analogy to a computer program.
- Many claimed that DNA or genomes specify the anatomy of an organism.
- Many claimed that genotypes (the DNA in organisms) specify phenotypes (the observable characteristics of an organism).
- Many claimed that genotypes (the DNA in organisms) "map" phenotypes (the observable characteristics of an organism) or "map to" phenotypes.
- Many claimed that DNA contains "all the instructions needed to make an organism."
- Many claimed that there is a "genetic architecture" for an organism's body or some fraction of that body.
- Using a little equation, many claimed that a "genotype plus the environment equals the phenotype," a formulation as false as the preceding statements, since we know of nothing in the environment that would cause phenotypes to arise from genotypes that do not specify such phenotypes.

There was never any justification for making any such claims. The only coding system that has ever been discovered in DNA is a system allowing only low-level chemical information to be specified. That coding system (shown below) is known as the genetic code, and it is merely a system whereby certain combinations of nucleotide base pairs in DNA stand for amino acids. So a section of DNA can specify the amino acids that make up a protein molecule. But no one has ever discovered any coding system by which DNA could specify anything larger than a protein molecule.



No one ever discovered any coding system in DNA by which parts of DNA can specify high-level anatomy such as the arrangement of parts in an organ, or a skeletal structure, or an overall body appearance. No one has even discovered any coding system in DNA by which either the structure or the bodily position of cells can be specified. The human body has at least 200 types of cells, and the structure of none of these cell types is specified by DNA. DNA does not even specify the structure of organelles that are the building blocks of cells.

If you ponder the simple fact that blueprints don't build things, you can start to get an idea of how nonsensical is the claim that a human arises because a DNA blueprint is read. Blueprints have no power of construction. When buildings are built with the help of blueprints, it is because intelligent agents read the blueprints to get an idea of what type of construction work to do, and because intelligent agents then follow such instructions. But there is nothing in the human body below the neck with the power to understand and carry out instructions for building a body if they happened to exist in DNA.

Consider what goes on when you read a web page at a complicated site such as www.facebook.com or www.buzzfeed.com. What occurs is a very complicated interaction between two things: (1) a web page that is rather like a blueprint for how the page should look and act, and (2) an extremely complicated piece of software called a web browser, which is rather like a construction crew that reads the web page's blueprint (typically written in HTML), and then constructs very quickly a well-performing web page. If the web browser did not exist, you would never be able to get a well-performing web page. The construction of an internally dynamic three-dimensional human body would be a feat trillions of times more complicated than the mere display of a two-dimensional web page. Just as it is never enough to have just a web page without a web browser, having some DNA blueprint for building a body would never be enough to build a body. You would also need to have some "body blueprint reader" that would be some system almost infinitely more complicated than a web browser, in order for a body to get built.

We have no evidence that DNA contains any instructions for building cells or anatomy, and we also have no evidence for the existence of any such thing as a "body blueprint reader" in the human body, capable of reading, understanding and executing incredibly complicated instructions for building a human body. When you consider the amount of organization in a human body, you may start to realize the gigantic absurdity of thinking that a human specification can be found in some molecular merely listing low-level chemical information.

The organization of large organisms is extremely hierarchical. Subatomic particles are organized into atoms, which are organized into amino acids, which are organized into protein molecules, which are organized into protein complexes, which are organized into organelles, which are organized into cells, which are organized into tissues, which are organized into organs, which are organized into organ systems, which are organized into organisms.

Cells are so complex they have been compared to factories or cities. The diagrams you see of cells are enormously misleading, making them look a thousand times simpler than they are. A cell diagram will show maybe 20 or 30 organelles in a cell, but the actual number is typically more than 1000. A cell diagram will typically depict a cell as having only a few mitochondria, but cells typically have many thousands of mitochondria, as many as a million. A cell diagram will typically depict a cell as having only a few lysosomes, but cells typically have hundreds of lysosomes. A cell diagram will typically depict one or a few stacks of a Golgi apparatus, each with only a few cisternae, but a cell will typically have between 10 and 20 stacks, each having as many as 60 cisternae. There are about 200 different types of cells in the human body.

Internally organisms are enormously dynamic, both because of constant motion inside the body, and also because of a constant activity inside the body involving cellular changes. Just one example of this enormously dynamic activity is the fact that protein molecules in the brain are replaced at a rate of about 3% per day. A large organism is like some building that is constantly being rebuilt, with some fraction of it being torn down every day, and some other fraction of it being replaced every day. The analogy comparing a cell to a factory gives us some idea of the gigantically dynamic nature of organisms.

When we consider this complexity, you may realize that the very idea of a blueprint for building a body is an absurdity. To have a visual specification for building a human body, you would need something more like a thousand-page textbook filled with color diagrams and tons of fine print. Even if such a specification existed in the human body, it wouldn't explain morphogenesis: because the specification would be so complex it would require some super-genius to understand it all and build things according to such a specification.

So how does a full-sized human body manage to arise from the tiny barely visible simplicity of a speck-sized egg existing just after human conception? This is a miracle of origination a thousand miles over the heads of today's scientists.

Because the lie that DNA is a blueprint or program or recipe for building bodies has so often been told, I will need to cite again a list I have compiled of distinguished scientists and other PhDs or MDs who have told us such an idea is untrue. Below is the list:

- On page 26 of the recent book *The Developing Genome*, Professor David S. Moore states, "The common belief that there are things inside of us that constitute a set of instructions for building bodies and minds -- things that are analogous to 'blueprints' or 'recipes' -- is undoubtedly false."
- Biologist Rupert Sheldrake says this "DNA only codes for the materials from which the body is constructed: the enzymes, the structural proteins, and so forth," and "There is no evidence that it also codes for the plan, the form, the morphology of the body."
- Describing conclusions of biologist Brian Goodwin, the New York Times says, "While genes may help produce the proteins that make the skeleton or the glue, they do not determine the shape and form of an embryo or an organism."
- Professor Massimo Pigliucci (mainstream author of numerous scientific papers on evolution) has stated that "old-fashioned metaphors like genetic blueprint and genetic programme are not only woefully inadequate but positively misleading."
- Neuroscientist Romain Brette states, "The genome does not encode much except for amino acids."
- In a 2016 scientific paper, three scientists state the following: "It is now clear that the genome does not directly program the organism; the computer program metaphor has misled us...The genome does not function as a master plan or computer program for controlling the organism; the genome is the organism's servant, not its master.
- In the book *Mind in Life* by Evan Thompson (published by the Belknap Press of Harvard University Press) we read the

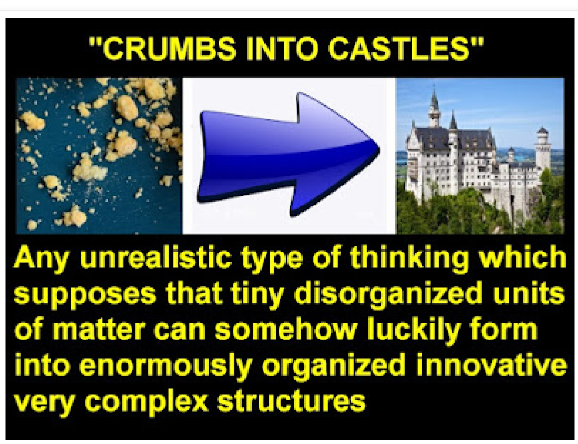
following on page 180: "The plain truth is that DNA is not a program for building organisms, as several authors have shown in detail (Keller 2000, Lewontin 1993, Moss 2003)."

- Developmental biologist C/H. Waddington stated, "The DNA is not a program or sequentially accessed control over the behavior of the cell."
- Scientists Walker and Davies state this in a scientific paper: "DNA is not a blueprint for an organism; no information is actively processed by DNA alone...DNA is a passive repository for transcription of stored data into RNA, some (but by no means all) of which goes on to be translated into proteins."
- Geneticist Adam Rutherford states that "DNA is not a blueprint."
- "The genome is not a blueprint," says Kevin Mitchell, a geneticist and neuroscientist at Trinity College Dublin, noting "it doesn't encode some specific outcome."
- "DNA cannot be seen as the 'blueprint' for life," says Antony Jose, associate professor of cell biology and molecular genetics at the University of Maryland, who says, "It is at best an overlapping and potentially scrambled list of ingredients that is used differently by different cells at different times."
- Sergio Pistoi (a science writer with a PhD in molecular biology) tells us, "DNA is not a blueprint," and tells us, "We do not inherit specific instructions on how to build a cell or an organ."
- Michael Levin (director of a large biology research lab) states that "genomes are not a blueprint for anatomy," and after referring to a "deep puzzle" of how biological forms arise, he gives this example: "Scientists really don't know what determines the intricate shape and structure of the flatworm's head."
- Ian Stevenson M.D. stated "Genes alone - which provide instructions for the production of amino acids and proteins -- cannot explain how the proteins produced by their instructions come to have the shape they develop and, ultimately, determine the form of the organisms where they are," and noted that "biologists who have drawn attention to this important gap in our knowledge of form have not been a grouping of mediocrities (Denton, 1986; Goldschmidt, 1952; B. C. Goodwin, 1985, 1988, 1989, 1994; Gottlieb, 1992; Grasse, 1973; E. S. Russell...Sheldrake, 1981; Tauber and Sarkar, 1992; Thompson, 1917/1942)."
- Biologist B.C. Goodwin stated this in 1989: "Since genes make molecules, genetics...does not tell us how the molecules are organized into the dynamic, organized process that is the living organism."
- An article in the journal Nature states this: "The manner in which bodies and tissues take form remains 'one of the most important, and still poorly understood, questions of our time', says developmental biologist Amy Shyer, who studies morphogenesis at the Rockefeller University in New York City."
- Timothy Saunders, a developmental biologist at the National University of Singapore. says, "Fundamentally, we have a poor understanding of how any internal organ forms."

- On the web site of the well-known biologist Denis Noble, we read that "the whole idea that genes contain the recipe or the program of life is absurd, according to Noble," and that we should understand DNA "not so much as a recipe or a program, but rather as a database that is used by the tissues and organs in order to make the proteins which they need."
- A paper by Stuart A. Newman (a professor of cell biology and anatomy) discussing at length the work of scientists trying to evoke "self-organization" as an explanation for morphogenesis states that "public lectures by principals of the field contain confidently asserted, but similarly oversimplified or misleading treatments," and says that "these analogies...give the false impression that there has been more progress in understanding embryonic development than there truly has been." Referring to scientists moving from one bunk explanation of morphogenesis to another bunk explanation, the paper concludes by stating, "It would be unfortunate if we find ourselves having emerged from a period of misconceived genetic program metaphors only to land in a brave new world captivated by equally misguided ones about self-organization."
- Referring to claims there is a program for building organisms in DNA, biochemist F. M. Harold stated "reflection on the findings with morphologically aberrant mutants suggests that the metaphor of a genetic program is misleading." Referring to self-organization (a vague phrase sometimes used to try to explain morphogenesis), he says, "self-organization remains nearly as mysterious as it was a century ago, a subject in search of a paradigm."

Very clearly, when we were told so often that DNA is a specification for making an organism, we were told a falsehood. DNA does not explain bodies. Your body did not originate because a DNA plan for making you was read from your body or from your mother's body.

The magnificent hierarchical organization of the human body can be compared to a castle (although the human body is actually far more impressive an example of organization). The claim that organization so immense arose from an accumulation of accidental DNA mutations is an example of what I call "crumbs into castles" thinking.



Bodies Do Not Explain Minds

People love one-word explanations, because they are so convenient to evoke. When asked to explain some very complex reality, nothing can top the convenience of being able to merely use a one-word term and pretend that you have an explanation, rather than going to the trouble of speaking or writing something like a very long nuanced paragraph including realistic talk about aspects of the problem beyond your understanding. Besides fallaciously appealing to one-word explanations such as "evolution," and "DNA," the most common example of a dubious one-word explanation in scientific academia is when biologists try to explain minds by merely offering "bodies" or "brains" as an explanation.

Nothing in your body or your brain explains the most basic facts such as consciousness or self-hood or understanding. Romain Brette is a neuroscientist actively engaged in neuroscience research. He states in a post on his blog, "I have no idea why neural activity should produce any conscious experience at all." Neither does any other neuroscientist.

Scientists have not made any progress in giving a credible explanation as to how a brain could generate any such thing as an abstract idea. An idea is a mental thing. We have some idea of how mental things can produce other mental things (such as how one idea can lead to another idea). We also understand how physical things can produce other physical things. But no one really has any idea at all how a physical thing could possibly produce a purely mental thing.

Let us imagine an organism with a single neuron in its skull. We can think of no reason why such an organism would be capable of producing a thought. If we then imagine an organism with 100 billion neurons in its skull, all unconnected, then we can still think of no reason why thoughts should start coming from such a set of neurons. Why would 100 billion neurons be able to think when a single neuron was not able to think? No one can say. If we imagine not just 100 billion neurons but 100 billion inter-connected neurons, there is still no reason why thought should be expected to flow out of such an arrangement of matter. If someone says that with such an arrangement we would expect thoughts to pour forth, it is only because he has been told all of his life that thought comes from a brain that is billions of neurons connected with each other. Similarly, if the person has been told all his life that thought is a product of liver secretions, then such a person would laugh very hard at the idea that thoughts can be produced by some arrangements of neurons, but he would tell you that we should expect thoughts to come from any organs that secreted fluids like the human liver does.

Humans have no experience with any machine capable of producing thoughts, so humans cannot say that such and such a mechanical arrangement of matter should be expected to produce thoughts. But humans do have experience in designing and building machines (computers) that are capable of storing information for years and also capable of instantly retrieving information. From such work humans have got some ideas about the kind of characteristics a system has to have to be capable of permanently storing large amounts of information, and capable of instantly retrieving information. Such things include:

- some encoding system by which information can be transformed into the form in which it is stored;

- some writing capability by which information can be written at some particular spot;
- some capability by which information is permanently preserved once it has been written;
- various capabilities (such as a reading component and indexing and a coordinate system or position notation system) which allow a specific piece of information to be instantly found and read;
- a decoding system by which information that had been stored in encoded form could be decoded so that it could be used.

The problem is that no sign of any such thing can be found in the human brain. No one knows of any capability by which a brain could translate human learned knowledge or episodic memories into brain states or neural states. No one knows of any capability by which a brain could write such information once it had been encoded. No one knows of any capability by which a brain could store learned information for decades. No one knows of any capability by which a brain could read information that had been stored in it, and translate such encoded information into thoughts. The brain has nothing like a position notation system, a coordinate system, an indexing system, a reading unit or a writing unit. Computers store information using a spinning disk, and what is called a read/write head, which can move to access various positions on such a disk. Nothing like that exists in the brain. There is no mobile unit in the brain that moves around to read or write from a particular spot, like the blinking cursor in a word processing unit. When scanned during mental activities, brains never look like they are reading information from one particular spot, and never look like they are writing information to one particular spot.

The fact is that our neuroscientists have done nothing to explain the wonder of human memory. We know of nothing in a brain that is a credible candidate mechanism to explain human memory storage. We know of nothing in a brain that is a credible candidate mechanism to explain instant memory retrieval. The phrases that neuroscientists mutter when asked to explain human memory do not qualify as explanations. Such neuroscientists mutter vague phrases such as "synapse strengthening," hoping that we overlook the fact that information is never written by some mere act of strengthening.

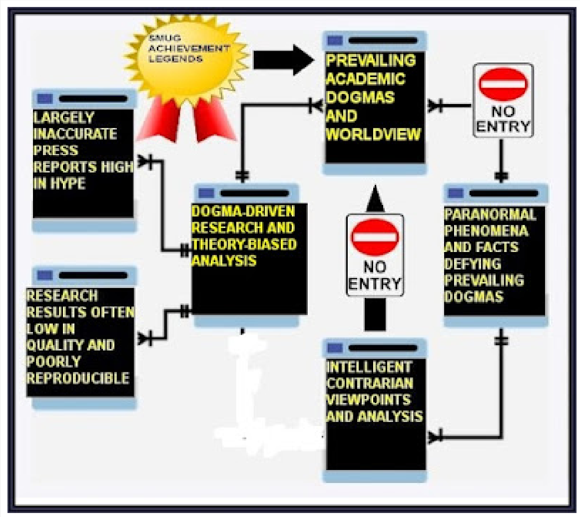
With their left hands our neuroscientists have discovered facts that contradict the claims that neuroscientists write with their right hands. Among these facts are the following:

- The fact that the average lifetime of the proteins that make up synapses is only a few weeks or less, 1000 times shorter than the maximum length of time that humans can reliably remember things (sixty years or more).
- The fact that synapses are structurally entangled with or dependent upon units called dendritic spines we can observe with powerful microscopes, and that such dendritic spines have a half-life of roughly 120 days, and that there is no evidence any dendritic spines last for more than a few years (with dendritic spines in the hippocampus having particularly short average lifetimes of days rather than months).
- The fact that within the brain there are many types of serious noise all over the place, the kind of thing which should prevent any reliable memory recall if memories were stored in brains.

- The fact that the great majority of synapses are chemical synapses subject to the very severe cumulative slowing factor of synaptic gaps, which should prevent anyone from being able to instantly recall any learned factual information.
- The fact that while humans such as Hamlet actors and Wagnerian tenors can flawlessly recall very large bodies of learned information, each transmission across a chemical synapse occurs with less than 50% reliability, which should prevent any accurate recall of large bodies of information from synaptic storage locations. According to the paper here, "In the cortex, individual synapses seem to be extremely unreliable: the probability of transmitter release in response to a single action potential can be as low as 0.1 or lower."
- The fact that the brain is completely lacking in any kind of indexing system, coordinate system or position notation system, which should prevent any instant recall of learned information, preventing a brain from being able to instantly find the exact spot or spot where memory information was neurally stored.
- The fact that the protein synthesis postulated by neuroscientists as a key factor in memory formation is something that requires minutes of time, a length of time far greater than the instantaneous memory formation that humans routinely display.

Besides failing to explain the ordinary facts of human mental performance, bodies and brains fail to explain extraordinary human mental experiences and extraordinary human mental performance, which are commonly described using the word "paranormal." It is sometimes said that the systematic scientific study of the paranormal began with the founding of the Society for Psychical Research in the late nineteenth century. That is not correct. We have nearly two hundred years of systematic scientific evidence for the paranormal, which dates all the way back to the second committee on Mesmerism (1825-1831) carried out by the Royal Academy of Medicine in France, a committee which resoundingly found in favor of the existence of clairvoyance (as discussed here). Every decade of human experience since 1831 has provided abundant written evidence of human experiences and human capabilities that cannot be explained by any neural theory of memory and minds. Some of the reasons why phenomena such as ESP cannot be credibly explained under any bodily explanation or brain explanation are discussed here.

What goes on in neuroscience departments of universities is a kind of giant game of "wear the horse blinders" under which neuroscience professors pretend that a large fraction of the most important human observations never occurred. The diagram below illustrates the situation. The "Prevailing Academic Dogmas and WorldView" in the diagram is maintained largely by customs of evidence censorship, in which evidence conflicting with prevailing academia dogmas is excluded from college textbooks and from university courses.



Let's consider just one tiny fraction of this evidence censorship. Studies suggest that the phenomenon of deathbed apparitions (also called end-of-life visions) occurs to between 10% and 35% of the population. A survey of family members of deceased Japanese found that 21% reported deathbed visions. A study of 103 subjects in India reports this: "Thirty of these dying persons displayed behavior consistent with deathbed visions-interacting or speaking with deceased relatives, mostly their dead parents." A study of 102 families in the Republic of Moldava found that "37 cases demonstrated classic features of deathbed visions--reports of seeing dead relatives or friends communicating to the dying person." A 1949 book states this:

"It is a commonplace truth, observed by many physicians and clergymen, that a dying person, when conscious near the moment of death, acts or speaks as if he saw standing near loved ones who have already died. Dr. Russell Conwell told Bruce Barton in the interview quoted earlier in another connection, that he had witnessed this phenomenon 'literally hundreds of times.' "

But this very important observational phenomenon is completely ignored by the vast majority of psychologists and neuroscientists. The type of evidence censorship that is going on is as great as it would be if the medical community were to deny the existence of migraine headaches, which we have reason to believe do not occur to a higher percentage of the population than deathbed apparitions or end-of-life visions (studies report migraine headaches occurring to between about 3% and 21% of the population). Deathbed apparitions and end-of-life visions make up only a tiny fraction of the evidence for the paranormal that neuroscientists and psychologists exclude from their papers and textbooks.

When someone has to resort to massive evidence censorship, it is a symptom of a severe explanatory dysfunction. For example, if someone maintains that all dogs are small and lap-sized, and he tries to maintain that belief by allowing only the publication of books that refer exclusively to small dogs (or books suggesting that anyone reporting large dogs is hallucinating), then something has gone very, very wrong in the thought process of such a person. Similarly, when neuroscience departments and psychology departments find it necessary to exclude from their courses and textbooks some of the most important experiences and observations humans have made, for the sake of excluding observations that do not fit with their prevailing dogmas of brains making minds, then something has gone very, very wrong.

But paranormal phenomena are just "icing on the cake" in regard to showing that bodies and brains do not explain minds. You can show that nothing in the body can explain a human mind and human memory by discussing only facts that are not disputed by neuroscientists: the neuroscience facts and case histories I discuss in the posts of this blog.

at July 17, 2022 3 comments:

Sunday, July 10, 2022

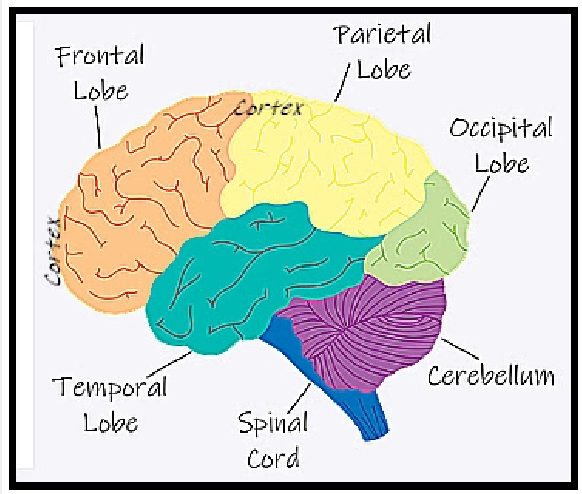
Cognitive Effects of Epilepsy Surgery Clash with "Brains Make Minds" Dogma

Epilepsy is a disease causing seizures. When the seizures are frequent, the disruption to a patient's quality of life can be so great that brain surgery may be recommended. In such surgery, large chunks of the brain may be removed. In other cases, the corpus callosum that connects the two hemispheres of the brain may be severed. The most extreme type of brain surgery is hemispherectomy, in which an entire half of the brain is removed.

I have already written several posts on the surprisingly small effects of hemispherectomy operations. Let us look at some reports of the cognitive effects of lesser types of surgery to treat epilepsy. One such type of surgery is temporal lobe resection. A paper tells us this about removal of the temporal lobe: "cognition remains relatively stable in the years following right temporal resection." Another paper discusses surgery in the posterior cortex of the brain. Using the word "resection" which refers to surgical removal of part of the brain, the paper states the following:

"The results of our study show that posterior cortical resections, either in the dominant or non-dominant hemisphere, do not lead to significant changes in general intelligence....This is in contrast to the outcome after temporal lobe resections. Several authors have shown a significant increase in full scale IQ (FSIQ) after non-dominant temporal lobe resection and only a slight increase or a decrease in FSIQ after dominant temporal lobe resections...PIQ [performance IQ] was almost invariably shown to be improved compared to baseline IQ, regardless of the side of temporal resections. The effect of dominant temporal lobe resections on VIQ [verbal IQ] seems to be somewhat inconsistent, with either decreasing or increasing scores, whereas right temporal lobe resection regularly leads to increasing scores."

This is hardly what we would expect if your brain is what makes your mind. It seems that taking out parts of the brain (called a resection) often is followed by an increase in scores on IQ tests.



Another paper states, "The data do not confirm concerns that patients undergoing temporal lobe epilepsy surgery are likely to develop accelerated memory decline over the longer term." Another paper states the following, suggesting no big cognitive effect from epilepsy surgery:

"Pooled data on IQ, executive functioning, and attention indicated few patients show declines post surgery, but a substantial rate of improvement in verbal fluency with left-sided temporal surgery (27%) was found. Self-reported cognitive declines after epilepsy surgery were uncommon, and gains were reported in some domains where losses were found on objective tests (i.e., verbal memory and language). Variations in surgical techniques did not appear to have a large effect on cognitive outcomes, except for naming outcomes, which appeared better with more conservative resections. Sensitivity to postoperative changes differed across visual memory tests, but not verbal memory tests. Few conclusions could be made regarding cognitive risks and benefits of extratemporal epilepsy surgery, or of epilepsy surgery in children."

The paper "Neuropsychological outcome following frontal lobectomy for pharmacoresistant epilepsy in adults" here deals specifically with the surgical removal of the frontal lobe to treat epilepsy. Neuroscientists have made more claims about the frontal lobe than any other part of the brain. We have been told that the frontal lobe is some kind of center of judgment and memory, although there are many reasons for rejecting such claims. The paper (which studied 90 patients) states the following :

"Forty-eight percent of the sample did not show decline on any of the 16 cognitive measures examined in this study. Forty-two showed decline on measures in 1 or 2 cognitive domains. In contrast, 10% of the sample showed declines in 3 or more cognitive domains."

Elsewhere the paper states, "The vast majority of patients who undergo frontal lobectomy for treatment of pharmacoresistant epilepsy demonstrate good cognitive and motor outcomes." Using the term "frontal lobectomy" for the removal of the front part of the brain, the paper also states, "Interestingly, there was a subset of patients who demonstrated clinically meaningful improvements in confrontation naming (15% of sample), verbal intellectual function (11%), or memory (10%–17%) following frontal lobectomy." The paper says, "Existing studies that have examined change in intellectual functioning following frontal lobe surgery have had mixed results, with some studies reporting no change on intelligence measures and others reporting apparent improvements."

Another relevant paper is the paper "Determinants of IQ outcome after focal epilepsy surgery in childhood: A longitudinal case-control neuroimaging study." We read the following:

"Fifty-two children (28 boys, 24 girls) were evaluated for epilepsy surgery and reassessed on average 7.7 years later...). Pre- and postsurgical assessments included IQ tests and T1-weighted brain images...Applying a ≥10-point change threshold, 39% of the surgically treated children improved, whereas 10% declined."

We are not told in this paper how large was the matter removed from the brains of these children, but it is known that epilepsy surgery typically involves removing large parts of the brain, sometimes as much as 50%. Again, we have a result that is inconsistent with claims that the brain generates the mind.

Another relevant paper is "Neuropsychological outcomes after epilepsy surgery: systematic review and pooled estimates." The paper was a meta-analysis that reviewed 23 other papers on the cognitive effects of epilepsy surgery. Four of the studies dealt with IQ changes. The paper states, " Epilepsy surgery was associated with an average 11% loss and 16% gain in IQ for combined left and right surgical groups." The wording of the paper's summary of findings about verbal memory decline is ambiguous, so I won't quote it. But I will note that the paper reports significant percentages of subjects having an improvement in verbal memory, with many others having a decline. The paper states this:

"For visual memory (six studies), average loss was 21% (95% CI 13 to 31) for left sided surgery and 23% (95% CI 18 to 29) for right sided surgery and average gain was 15% (95% CI 10 to 21) in left sided surgery and 10% (95% CI 7 to 13) in right sided surgery. In one study involving children where side of surgery was not reported, gains in verbal and visual memory were 10% and 25% of children, respectively and risks of loss were 5%."

Summarizing four studies dealing with changes in executive function after epilepsy surgery, the paper states this:

"Left and right sided surgery were associated with a loss of 1% and 0% respectively (one study) and a gain of 9% and 4% (one study) in mental flexibility. Left and right sided surgery were associated with an average loss of 10% (95% CI 4 to 23; 3 studies) and 21% (two studies) respectively and an average gain of 27% (95% CI 10 to 55; 2 studies) and 16% respectively (two studies) in word fluency. In left and right sided surgery, two studies reported an average loss of 6% and 2% respectively and an average gain of 10% and 15% respectively in attention."

Summarizing three studies dealing with "overall subjective change in multiple abilities," the paper finds that "Regardless of side of surgery, average overall loss was 9% and average overall gain was 18%."

Overall, the results reported above are in conflict with dogmas that the brain is the source of the human mind and the storage place of human memories. Epilepsy surgery typically involves removing large chunks of the human brain, as much as 50%. The studies mentioned above do not show the kind of big mental damage we would expect under such a dogma. The studies often mention improvements in mental function that are inexplicable under the dogma that the brain is the source of the human mind.

at July 10, 2022 No comments:

Labels: brain surgery, epilepsy, high mental function despite large brain damage

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Head Truth

The huge case for thinking minds do not come from brains

Sunday, July 3, 2022

Some Brain Wave Analysts Are Like "Face of Jesus in My Toast" Claimants

The site www.neurosciencenews.com is a frequent supplier of dubious brain-related stories, very many of which start out with unfounded headlines not matching anything that was actually observed. The site's latest not-really-true headline is one proclaiming "First Evidence of Replay During Sleep in the Human Motor Cortex, Which Governs Voluntary Movement." As a general rule, you should tend to be suspicious of anyone claiming to provide the first evidence of something, particularly anything having to do with the brain and the mind.

The article attempts to persuade us that while someone was sleeping, his brain was replaying some memory of a motor skill that the person had recently learned. The article refers to a scientific paper that provides no robust evidence of such a thing, providing no justification for its title of "Learned Motor Patterns Are Replayed in Human Motor Cortex during Sleep." The paper is another study guilty of Questionable Research Practices, which are epidemic these days in experimental neuroscience. The paper gives us another example of what is going on very frequently in neuroscience research these days: scientists making claims in titles and abstracts that are not justified by any observations described in the paper.

Here is a quote from the www.neurosciencenews.com article. An extremely dubious speculation is passed off as a "discovery," but while describing this supposed "discovery" the text admits what is going on is "theorizing," something better described as mere speculation.

"Scientists studying laboratory animals long ago discovered a phenomenon known as 'replay' that occurs during sleep, explains neurologist Daniel Rubin, MD, Ph.D., of the MGH Center for Neurotechnology and Neurorecovery, the lead author of the study.

Replay is theorized to be a strategy the brain uses to remember new information. If a mouse is trained to find its way through a maze, monitoring devices can show that a specific pattern of brain cells, or neurons, will light up as it traverses the correct route.

'Then, later on while the animal is sleeping, you can see that those neurons will fire again in that same order,' says Rubin. Scientists believe that this replay of neuronal firing during sleep is how the brain practices newly learned information, which allows a memory to be consolidated—that is, converted from a short-term memory to a long-term one."

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- Reasons for Doubting a Brain Could Do the Super-Complex Encoding Needed to Neurally Store Episodic Memories or Concepts
- The Promissory Notes of Materialist Professors Are Long Past Due
- Study Finds No Correlation Between Number of Neurons and IQ
- The Many Cases Showing a Person's Mind Can Operate When His Brain Has Shut Down

No such "replay" was ever discovered. What is going on seems to be simply pareidolia, which is when people eagerly seeking some pattern claim that they have detected such a pattern, like someone checking his toast every day eagerly looking for the face of Jesus, and one day reporting that he finds a piece of toast that looks like Jesus.

Let's imagine some society dedicated to showing that the clouds above us contain the ghosts of dead animals. Given many eager researchers who scan the clouds day after day looking for shapes that look like the shapes of animals, such a society would probably be able to report some successes, finding a few clouds that look like animals. Similarly, let us imagine some experimenters want to show that some brain activity occurring during some motor activity is "replayed" during sleep. Given eight hours of recordings of brain activity during sleep, it will not be too unlikely that such experimenters would report that sometime during sleep there was some brain wave activity that looked like the brain wave activity that occurred when the motor activity occurred when a subject was not asleep.

Below are some of the things that can help you sort out whether or not robust evidence has been provided:

(1) **Look for adequate sample size.** If a study used 15 or more subjects per study group, it is a good sign that the study may have used an adequate sample size. The "Learned Motor Patterns Are Replayed in Human Motor Cortex during Sleep" paper uses the grand total of only one subject.

(2) **Look for an adequate number of control subjects.** A well-designed study will use an adequate number of control subjects. We can imagine how control subjects could have been effectively used in a study like this. Brain waves could have been read from 30 subjects, 15 of whom had learned something, and 15 of whom had not learned that thing. But the "Learned Motor Patterns Are Replayed in Human Motor Cortex during Sleep" does not mention any control subjects. All measurements seemed to have occurred from only one subject.

(3) **Look for a well-designed blinding protocol.** A well-designed study will use a blinding protocol designed to minimize the chance that researchers will observe and analyze data in a biased way to get whatever result they are hoping to get. The "Learned Motor Patterns Are Replayed in Human Motor Cortex during Sleep" paper does not mention any blinding protocol or blinding procedure. If the study had been done properly, analysts would have been blind as to whether brain waves they were analyzing came from the control subjects who had not learned the motor skills that were supposedly "replayed" or from subjects who had learned such skills.

(4) **Look for pre-registration.** With a pre-registered study, scientists commit themselves to one particular way that data will be gathered and analyzed, a method publicly committed to before any data is gathered. When pre-registration is not used, we should always be suspicious that scientists have simply "sliced and diced" data in as many ways as they wanted, until it coughed up something maybe looking a little like the desired effect. The use of pre-registration minimizes the chance that a scientific paper is a kind of "keep torturing the data until it confesses" affair. The "Learned Motor Patterns Are Replayed in Human Motor Cortex during Sleep" paper is not a pre-registered study.

- A Soul Might Explain Instincts, but DNA and Brains Cannot
- Five Hallmarks of an Information Storage System (None of Which Your Synapses Have)
- Your Physical Structure Did Not Arise Bottom-Up, So Why Think Your Mind Did?
- Why a "Mechanical Memory" Theory Does Not Work
- The Brain Seems to Have No Mechanism for Reading or Writing Memories
- No One Understands How a Brain Could Generate Ideas
- Prevailing Brain Dogmas Cannot Explain Hypnotic Phenomena
- 30 Reasons for Rejecting the Theory of Neural Memory Storage
- Common Experiences That Show the Untruth of Professorial Memory Claims
- Neuroscience Research Customs Guarantee an Abundance of Junk Science
- Groupthink and Peer Pressure Make It Taboo for Neuroscientists to Put Two and Two Together
- The Social Construction of Eager Community Mirages
- Preprint Server Counts Suggest Engrams Are Not Really Science
- Engrams Are Touted Like Phlogiston Was Once Touted
- Synaptic Delays Mean Brain Signals Must Move at a Snail's Pace
- Raven Smarts Defy Prevailing Brain Dogmas
- No One Can Credibly Explain Why a Brain Would Store a Memory in One Specific Spot
- Brain Dogmas Versus Case Histories That Refute Them
- Inaccurate Titles and Misleading Citations Are Common in Science Papers
- In Neuroscience Papers Bluffing Is More Common Than Candor
- Young Age of Languages Contradicts Claims of Neural Storage of Linguistic Information
- Vacillating Disarray of the Memory Trace Theorists
- Study Finds "Poor Overall Reliability" of Brain Scanning Studies
- "Brains Store Memories" Dogma Versus the Reality of Noisy Brains
- The Brain Has Nothing Like 7 Things a Computer Uses to Store and Retrieve Information

(5) **Look for a statement of an effect size.** When robust evidence has been found, researchers will typically report an effect size. The "Learned Motor Patterns Are Replayed in Human Motor Cortex during Sleep" paper does not report any effect size.

We can imagine what a study might look like if it were to show convincing evidence of neural replay during sleep of a learned muscular behavior. We might see one long squiggly line showing a brain wave recorded when the muscular activity was occurring when the subject was awake. We might then see another long squiggly line showing a brain wave recorded at some point during sleep. The two wiggly lines (each with many up crests) might match exactly, in a way that might be unlikely to occur unless the brain was replaying a muscle memory. We would see in the paper an impressive visual showing one long wiggly brain wave line exactly matching another long wiggly brain wave line. The "Learned Motor Patterns Are Replayed in Human Motor Cortex during Sleep" paper has no such visual.

In the section of the paper entitled "Quantification and Statistical Analysis," we have a "jargon gobbledygook" description of the tortuous statistical rigmarole that went on, a section that might have honestly been labeled "Desperately Seeking Replay Evidence." Below is a description of only part of the byzantine "Rube Goldberg machine" statistical maneuvering that was occurring:

*"We used these templates to probe for evidence of replay during the resting and sleeping epochs as follows. At each time-step of the neural recording, for each of the two spatial dimensions, we calculated the cross-correlation between the template and the output of the steady-state Kalman filter. This process yielded two time-series of correlation coefficients equal in length to the time series of the neural recording. Separately for the X- and Y-dimensions, the 98th (for Session 1) or 99th (for Session 2) percentile of the correlation coefficients was chosen as the threshold to designate an activity pattern as a template match. We designated instances when the correlation crossed threshold in both the X- and Y-dimensions simultaneously as simultaneous threshold crossing events (STCEs). STCEs occurring over neighboring time-steps are classified as a single event. STCEs occurred tautologically during the awake task performance blocks. When occurring during rest or sleep, we refer to these instances as putative replay events. The specific percentile implemented as the threshold for a session was selected to optimize the performance of STCEs to correctly identify successful target trials and not identify unsuccessful target and all distractor trials during the active task performance. This was quantitatively operationalized by finding the integer percentile that jointly maximized the sensitivity and specificity (i.e., the Youden's J statistic: sensitivity + specificity − 1) of STCEs to accurately identify successful target trials during awake task performance. To evaluate whether there is relative preservation of neuronal firing sequence during these putative replay events, we determined the order of neuronal firing during each successful target trial and each putative replay event by calculating, for each channel (representing the single or multiunit activity recorded), the time bin within 4 s after the onset of the task completion or replay event that had the maximum firing rate. Thus, for each event (task performance or putative replay), a 96-element sequence was identified. To determine the preservation of firing order across events, we calculated the pairwise matching index I_m between each task completion and putative replay event, using the approach derived by **Ji and Wilson (2007)** where I_m is defined as follows. For an M-channel recording, there are M(M – 1)/2*

- Exhibit A Suggesting Scientists Don't Understand How a Brain Could Store a Memory
- The Dubious Dogma That Brains Make Decisions
- Long Article Tries to Show Neural Memory Storage, but Gives No Real Evidence for It
- How Evidence for ESP Undermines the “Minds Come From Brains” Dogma
- Gender Differences in Brains Help Discredit Prevailing Dogmas About Brains
- Study Finds Equal Brain Connectivity in All Mammals
- Some Reasons the Main Theory of Neural Memory Storage Is Unbelievable
- Scientists Can't Persuasively Explain How a Brain Could Instantly Retrieve a Memory
- The Lack of Evidence for Memory-Storage Engram Cells
- Candid Confessions of the Cognitive Experts
- Global Workspace Theory Sure Isn't an Explanation for Consciousness
- When Animals Cast Doubt on Dogmas About Brains
- Memories Can Form Many Times Faster Than the Speed of Synapse Strengthening
- The Guy with the Smallest Brain Had the Highest IQ
- He Had Half a Brain and Above Normal Intelligence
- The Truth About Neurons and Synapses
- A Diagram of Explanatory Dysfunction in Academia
- The Brain Shows No Sign of Working Harder During Thinking or Recall
- More Evidence of High Mental Function Despite Large Brain Damage
- The Lack of a Viable Theory of Neural Memory Encoding
- More Evidence That Neuron Loss Has Little Effect on Cognition
- Fraud and Misconduct Are Not Very Rare in Biology
- Reasons for Doubting Thought Comes from the Frontal Lobes or Prefrontal Cortex
- Why Most Animal Memory Experiments Tell Us Nothing About Human Memory
- Other Evidence of Human Paranormal Abilities

pairs of channels; between two events, let m be the number of pairs that have the same order of peak firing between the two events, and n be the number of pairs that have the opposite order. Define $I_m = (m - n)/(m + n)$*, such that* I_m *is bounded by [−1, 1]. Two events with precisely the same sequence of activation will have* $I_m = 1$ *and two events with exact opposite order of activation would have* $I_m = -1$*. To determine whether the distribution of matching indices we observe are greater than would be expected by chance, we generated a control distribution by calculating the matching indices of 100,000 pairs of randomly generated 96-element-long sequences...We randomly selected 100 segments of neural activity, each equal in duration to the successful target sequence templates, from the 30 min period of rest recorded immediately before the task blocks. We used the output of the Kalman filter generated by these randomly selected segments to produce a series of 100 pseudo-templates. For each pseudo-template, we repeated the template-matching procedure described above, calculating the cross-correlation between the template and the Kalman filter output at each time-step of the recording, and counted the number of STCEs for each pair of pseudo-templates. Because the generated distribution was highly left-skewed, we used a Wilcoxon rank-sum test to compare this distribution with our observed outcome from the true target template to determine whether the number of observed putative replay events was greater than would be expected by chance (i.e., compared with the distribution of STCEs produced from the pseudo-templates). Because the random 'pseudo-template' control described above did not necessarily preserve neural firing rate statistics, as a second control, we performed an alternative bootstrap procedure that specifically preserved the statistics of the underlying neural firing. In this control, for each of 100 iterations, the Kalman filter output for the duration of the recording was broken into 5 min segments. Within each segment, we used the discrete Fourier transform to randomize the phase of the X and Y dimension of the Kalman filter output. We then reassembled the segments into full-time-series and performed the same cross-correlation matching procedure described above using the true target templates....To assess for neuronal replay of target trajectories at different speeds, for each recording session, we used cubic splines to fit the pair of target Kalman filter trajectories and then adjusted the duration of the template using a temporal dilation/compression factor we define as τ. We varied τ over 18 values from 0.1 to 10. For each value of τ, the number of STCEs was calculated during each epoch as above. We ran the phase-randomized bootstrapping control at each value of τ to assess for statistical significance."*

I can give an analogy for what seems to be going on above. Although I have never used any version of the Photoshop software, I hear that it has many utilities called filters that allow you to make various transformations of images. Imagine if someone kept photographing his toast, but never seemed to get an image of Jesus. He might try playing around with Photoshop filters, subjecting each toast photo to many types of filters, until he finally got something that looked a little like Jesus. That would be rather like what is going on in the "Learned Motor Patterns Are Replayed in Human Motor Cortex during Sleep" paper. Sifting through hours of brain wave recordings of a sleeping subject, the authors seem to have played around with strange statistical manipulations until they got something that they can claim as some evidence of a brain replaying a memory during sleep. It seems like a "keep torturing the data until it confesses" kind of affair.

The "so many zig-zags" statistical procedure described in the "Learned Motor Patterns Are Replayed in Human Motor Cortex during Sleep" paper is so complicated a "hall of mirrors" with so many "madhouse rules" with a "make it up as you go along" kind of stink that no one will ever be able to impressively reproduce it using the same procedure, nor will the authors ever be able to justify the strange arbitrary analysis choices they made (when using an algorithm like a huge vat of tangled spaghetti). "Going deep down the rabbit hole" like that isn't sound experimental science, which generally involves straightforward well-justifiable procedures to yield reproducible results. The authors have not provided any robust evidence at all of brains replaying memories during sleep.

The Neuroscience News site at www.neurosciencenews.com has for very long been guilty of publishing unfounded headlines that are not justified by any research discussed in the story below the headlines. Besides the example discussed above, another example is the not-actually-true headline we recently saw at this site, a headline of "Molecular Mechanisms Behind Learning and Memory Identified." The story refers to a scientific paper that merely dealt with aversive memory in mice. The paper reveals that the study (which failed to follow a blinding protocol) used way-too-small study group sizes such as groups of only 6 or 7 or 8 mice. As a general rule of thumb, 15 subjects per study group is the minimum for a moderately convincing result. It's the same old story that has been going on for decades in the field of experimental neuroscience: experimenters using way-too-small study groups, and getting what are probably only false alarms, with the experimenters wrongly proclaiming that some important discovery was made.

The authors of the paper would have discovered how way-too-small their study group sizes were if they had done what should be done by anyone doing an animal experiment: the performance of a sample size calculation, in which you estimate how large a study group size is needed in order for the study to have a good statistical power. The authors confess that they failed to perform such a calculation. They state this:

"The sample sizes were not pre-determined. For all molecular biology experiments, cellular biology experiments, and behavior tests, sample size was chosen according to previous studies."

Since the use of way-too-small study group sizes is currently an epidemic in experimental neuroscience, with most experimenters failing to use adequate sample sizes, you do not at all justify your choice of a sample size by saying "sample size was chosen according to previous studies."

Another example of a recent unjustified headline on www.neurosciencenews.com is a headline of "Brain Region Found to Play a Crucial Role in Weighing Information From Different Sources." No such thing was actually discovered, because the scientific study mentioned was based on analysis of only two monkeys, a study group size way too small for a reliable result.

at July 03, 2022 No comments:

Labels: brain waves

Sunday, June 26, 2022

What the Neuroscientist Should Have Said When Asked About Mind Uploading

The web site *The Conversation* at www.theconversation.com is one of numerous mainstream web sites that attempt to propagate the talking points of materialist thinkers, usually in a very one-sided way in which all kinds of very important relevant facts are hidden from readers. Recently the site had an article entitled "When Will I Be Able to Upload My Brain to a Computer?" A neuroscientist professor named Guillaume Thierry answers a reader's question, which was this:

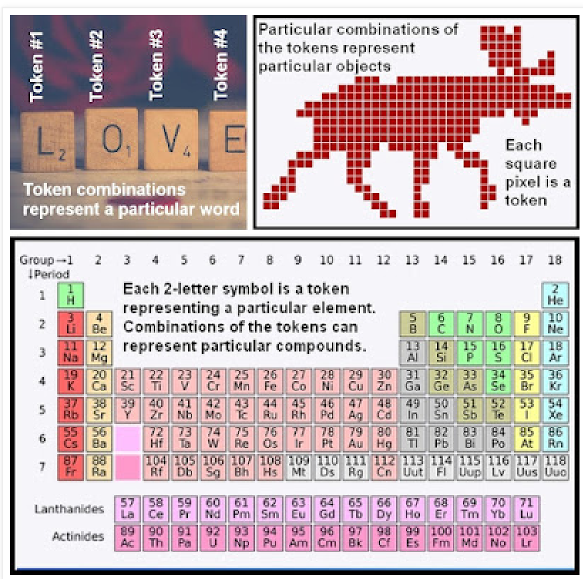
"*I am 59 years old, and in reasonably good health. Is it possible that I will live long enough to put my brain into a computer? Richard Dixon.*"

Professor Thierry answered the question in a poor fashion. He spoke largely as if the underlying assumption behind the question was a valid one. He should have discussed many facts of neuroscience that indicate the underlying assumption behind the question is an incorrect one. Although the question is rather awkwardly phrased, it is rather clear what assumption was behind the question asked by Mr. Dixon. The assumption was that there is some information and matter arrangement in a brain which somehow constitutes a person, and that it might be possible to transfer such information and matter arrangement to a computer.

The first thing that Professor Thierry should have discussed is that there is zero evidence that brains store information in the way that computers store information. Computers store information in a binary format which is also sometimes called a digital format. In such a format information is stored by a series of ones and zeros, such as 10101001101001010110010101011100O. There is no evidence that brains store information in any such manner. There seems to be nothing in a brain or neurons or synapses that would allow storage of information in any such manner. We can imagine a physical structuring of an organ that would allow the storage of long binary sequences such as 1001010100001111000101010100011110O101. The brain seems to have no physical component allowing any such storage.

We do know that neurons store information, but the only information ever discovered in a neuron is genetic information, the information stored in the nucleus of every cell. Such information is merely low-level chemical information, such as which amino acids make up particular protein molecules. The only type of information that has been discovered in neurons is the same low-level chemical information found in kidney cells and skin cells and heart cells and foot cells. No one has ever discovered any binary sequence such as 10010101000011110001010101000111100101 in a human brain.

Besides mentioning that there is no sign of any mechanism in a brain that could possibly store digital or binary information such as used by computers, Professor Thierry should have also mentioned that there is simply no physical signs of learned information stored in a brain in any kind of non-digital or non-binary organized format that resembles some kind of system of representation. We can imagine other ways in which information could be stored in a brain, some way that did not involve the simplicity of repeated ones and zeroes. If any other way was used, it would tend to have an easily detected hallmark: the hallmark of token repetition. There would be some system of tokens, each of which would represent something, perhaps a sound or a color pixel or a letter. There would be very many repetitions of different types of symbolic tokens.   Some examples of tokens are given below. Other examples of tokens include nucleotide base pairs (which in particular combinations of 3 base pairs represent particular amino acids), and also coins and bills (some particular combination of coins and bills can represent some particular amount of wealth).



Examples of symbolic tokens

Other than the nucleotide base pair triple combinations that represent mere low-level chemical information such as amino acids, something found in neurons and many other types of cells outside of the brain, there is no sign at all of any repetition of symbolic tokens in the brain. Except for genetic information which is merely low-level chemical information, we can find none of the hallmarks of symbolic information (the repetition of symbolic tokens) inside the brain. No one has ever found anything that looks like traces or remnants of learned information by studying brain tissue. If you cut off some piece of brain tissue when someone dies, and place it under the most powerful electron microscope, you will never find any evidence that such tissue stored information learned during a lifetime, and you will never be able to figure out what a person learned from studying such tissue. This is one reason why scientists and law enforcement officials never bother to preserve the brains of dead people in hopes of learning something about what such people experienced during their lives, or what they thought or believed, or what deeds they committed.

Were True

- "Brains Make Minds" Models All Flunk a Large Brain Scan Study
- The Philosophy of Teleospiritism
- The Biggest Blunders of Theories Such as Integrated Information Theory
- Study Finds No Robust Link Between Brain Structure and Personality
- The Two Huge Mistakes Involved in Typical Talk of a "Hard Problem of Consciousness"
- Neuroscientists Keep Wrongly Assuming the Source of Something Must Be Near Its Observed Manifestations
- The Vague Unfounded Boasts of Biology Sound Like the Vague Unfounded Boasts of Astrophysics
- 8 Reasons for Doubting Claims of the Heritability of Intelligence
- Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"
- Exhibit A Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- Exhibit B Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- More Indications Scientists Don't Understand How a Brain Could Think or Remember
- Studies New and Old Fail to Show a Big Link Between Brain States and Minds

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March 2023 (2)

Besides seeing no signs of stored memory information in brains, scientists are completely lacking in any detailed credible theory of how it is that a brain could store the type of things that people learn during their lifetimes. The difficulties of coming up with such a theory are endless. One gigantic difficulty is that humans learn a dizzying variety of things (sights, sounds, sensations, words, music, feelings, thoughts, concepts, muscle movements, and so forth), meaning that no imaginable system of symbolic encoding could handle even a third of the types of things people can learn. Another difficulty is that people are capable of remembering extremely long sequences of words and letters. But the very alphabets that are used to store such letters have only existed for a few thousand years. There is no evidence that humans have undergone some great brain change in the past few thousand years that might help to explain a storage of great amounts of information using alphabets that have only existed for a few thousand years. A scientific paper discussing human evolution in the past two thousand years tells us that "aside from height and body mass index (BMI), evidence for selection on other complex traits has generally been weak," and that there are merely faint signals for human evolution in a few other areas: "increased infant head circumference and birth weight, and increases in female hip size; as well as on variants underlying metabolic traits; male-specific signal for decreased BMI; and in favor of later sexual maturation in women, but not in men," in addition to "strong signals of selection at lactase and the major histocompatibility complex, and in favor of blond hair and blue eyes." There is no mention of any dramatic brain evolution that might explain a recent ability to store memories using alphabets that only arose in the past few thousand years.

The same problem exists in regard to explaining a human ability to remember oral music. Such music is expressed using a musical notation system that is only a few centuries old. But humans have no problem remembering vast lengths of oral music. In his prime performing years Placido Domingo was famous for having memorized male operatic roles in countless different operas, which altogether made up very many hours of singing he could perform without error.

The inability of neuroscientists to explain such wonders of memorization is not some minor shortfall. There is literally not a neuroscientist in the world who can give a credible detailed explanation of how anyone could store the simple phrase "my dog has fleas" in his brain or even the first line of the song "Mary had a little lamb." Yet there are Islamic scholars who have memorized every line of their holy book of 114 chapters, and actors and singers who have perfectly memorized very long roles such as Hamlet and Siegfried.

When asked to explain such things, all neuroscientists can do is mention little facts that fail to sound anything like an explanation for human memory. They may utter phrases such as "synaptic strengthening," ignoring the fact that the lifetimes of the proteins that make up synapses are about 1000 times shorter than the maximum length of time that humans can remember thing. The failure of neuroscientists to explain other aspects of human mentality is just as large. No neuroscientist has a credible explanation for such basic human mental realities as imagination or abstract thinking or insight.

On another web page a neuroscientist seems to confess that he and his colleagues have no idea of how groups of neurons could give rise to thoughts or emotions. He states this:

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October 2022 (5)
September 2022 (4)
August 2022 (4)
July 2022 (5)
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May 2022 (4)
April 2022 (4)
March 2022 (5)
February 2022 (4)
January 2022 (4)
December 2021 (5)
November 2021 (3)
October 2021 (3)
September 2021 (2)
August 2021 (3)
July 2021 (3)
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May 2020 (2)
April 2020 (1)
March 2020 (1)
February 2020 (2)
January 2020 (1)
December 2019 (1)
November 2019 (1)
September 2019 (1)
August 2019 (1)
July 2019 (2)
June 2019 (1)
May 2019 (1)
April 2019 (1)
February 2019 (1)
January 2019 (1)
December 2018 (1)
November 2018 (3)

"We need to understand how circuits of cells give rise to a thought, an emotion, a behavior. And this will be extremely difficult to penetrate."

I have repeatedly argued on this blog (in posts such as this and this) that physical limitations of brains mean that brains should be way too slow to account for things such as lightning-fast human thinking and recall. I found a scientific paper in which scientists confess just how bad is the speed problem within human brains. In the paper "Emission of Mitochondrial Biophotons and their Effect on Electrical Activity of Membrane via Microtubules," six scientists (some of them neuroscientists) make this interesting confession:

"*Synaptic transmission and axonal transfer of nerve impulses are too slow to organize coordinated activity in large areas of the central nervous system. Numerous observations confirm this view. The duration of a synaptic transmission is at least 0.5 ms, thus the transmission across thousands of synapses takes about hundreds or even thousands of milliseconds. The transmission speed of action potentials varies between 0.5 m/s and 120 m/s along an axon. More than 50% of the nerves fibers in the corpus callosum are without myelin, thus their speed is reduced to 0.5 m/s. How can these low velocities (i.e. classical signals) explain the fast processing in the nervous system?*"

Rather than candidly confessing such realities when asked about loading brains into computers, Professor Thierry speaks like someone with an underlying attitude of "we haven't done this yet because it's very hard." What he should have said is something like, "You should have every doubt that such a thing is possible, no matter how much we learn about the brain or computers." Similarly, suppose you ask a soil expert, "When will I be able to know all about the lives of all the previous owners of my land by analyzing the land's soil?" Such an expert will be giving you the wrong answer if he talks about how such a thing is hard. He will be pointing you in the right direction if he tells you there is no good reason to think that such a thing will ever be possible.

In responding to the question, Professor Thierry acted like a typical neuroscientist, by using the question to try and impress us by listing many little facts that he has learned. In answering the question he should have candidly confessed all of the things he does not know and does not understand about brains, mentality and memory. But neuroscientists don't like getting started on such a discussion, which rapidly leads us to questions that cause us to doubt the dogmas that neuroscientists keep spouting. So I'm sure Professor Thierry would have preferred not to start discussing his ignorance of why people near death so often report themselves floating out of their bodies and observing their bodies from above, a type of observation entirely inconsistent with claims that brains are the source of the human mind. And I'm sure Professor Thierry would have preferred not to start discussing his ignorance of how humans are able to perfectly recall vast bodies of information, even though each synaptic gap transmits signals with a reliability of less than 50%, which should make such recall impossible if it were occurring from neural activity. And I'm sure Professor Thierry would have preferred not to start discussing his ignorance of how mind and memory is well-preserved after half of a brain is removed to treat very bad seizures in epileptics, an observational reality dramatically inconsistent with the dogmas of neuroscientists.

Instead of telling us the neuroscience reality that no one has ever found any memory information by studying brain tissue, Professor Thierry advanced a groundless and easily discredited speculation when he stated this: "Information

September 2018 (1)
August 2018 (1)
July 2018 (1)
June 2018 (1)
April 2018 (30)

Labels

- "brain as computer" metaphor
- academia dysfunction
- adult neurogenesis
- AI
- binary memory storage theory
- brain changes with age
- brain connectivity
- brain effect on personality
- brain imaging
- brain injury
- brain research projects
- brain shortfalls
- brain signal speed
- brain surgery
- brain uploading
- brain waves
- claims of mind reading by brain scans
- claims of neural correlates of mental activity
- COVID-19
- decisions
- default mode network
- dendritic spines
- depression
- distributed recall hypothesis
- DNA
- EEG studies
- emergence
- epilepsy
- ESP
- evolution
- exceptional memory
- exceptional speed of thinking
- file drawer effect
- fraud
- free will
- genes
- global workspace theory
- groupthink
- health hazards in neuroscience experiments
- hemispherectomy
- high mental function despite large brain damage

in the brain is stored in every detail of its physical structure of the connections between neurons: their size and shape, as well as the number and location of connections between them." No one has any understanding of how learned information such as facts learned in school could ever be represented by changes in the sizes, shapes, numbers or locations of connections between neurons, nor does anyone have any credible detailed theory of how information could be stored in such a way. No evidence of symbolic tokens or information representation can be found by studying such connections. To the contrary, what we have learned about such connections (synapses) suggests the impossibility of the claim Thierry states. We know that synapses are "shifting sands" type of things, not stable structures that stay the same for decades. The proteins in synapses have average lifetimes of only a few weeks. Synapses are connected to unstable structures called dendritic spines, which have typical lifetimes of only a few weeks or months, and which don't last for years. See my post "Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades" for the relevant observations.

Given all this structural instability in synapses and their attached dendritic spines, and the constant very high levels of molecular turnover in such things, we should not believe the speculation that synapses are storing human memories which can survive with remarkable stability for 50 years or longer. Resembling the tangled, ever-changing vines in a dense part of the Amazon rain forest, synapses no more resemble an information storage system than do some jumble of such vines. No neuroscientist could ever even tell a credible detailed tale of how the mere phrase "my dog has fleas" could be stored by some variation in the size, shape, strength, number or location of brain connections (synapses).

Alarm bells should go off in our minds when we read Professor Thierry state this: "The brain seamlessly and constantly integrates signals from all the senses to produce internal representations, makes predictions about these representations, and ultimately creates conscious awareness (our feeling of being alive and being ourselves) in a way that is still a total mystery to us." When someone claims that something occurs in way that is a total mystery to him, it is often the case that no such thing is actually occurring. We have no actual evidence that brains "produce internal representations" from sensory signals, and no permanent signs of such internal representations can be found by studying brain tissue. We know that humans make predictions, but do not know that brains make predictions, nor do we know that brains create conscious awareness. From near-death experiences that may involve vivid conscious awareness during cardiac arrest in which the heart has stopped and the brain is shut down, we have a very strong reason for doubting claims that brains produce conscious awareness. In general we should tend to be skeptical about claims that x produces y when such claims are made by people confessing that such a thing happens in some way that is a total mystery.

If some old person is afraid of death and asks you about mind uploading, you might think: don't burst the guy's bubble and throw cold water on his hopes. But there's no reason to keep afloat hopes of immortality by mind uploading. A much better thing to do would be to explain all the reasons why it is utterly fallacious to think that you will be able to transfer your mind and memory into a robot or computer, and to include within that discussion some mention of how such reasons (and also many other reasons) should lead you to suspect that your mind and memory will survive the death of your body, largely on the

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

grounds that there is nothing in your brain or body that can explain your mind and your memory.

at June 26, 2022 No comments:

Labels: mind uploading

Sunday, June 19, 2022

Don't Be Fooled: Well-Trained Chatbots Aren't Minds

This week we have a story in the news about artificial intelligence. It seems that a Google engineer named Blake Lemoine told the Washington Post that he thought a Google project called LaMDA had reached "sentience," a term implying some degree of consciousness. The Washington Post article said, "“Most academics and AI practitioners … say the words and images generated by artificial intelligence systems such as LaMDA produce responses based on what humans have already posted on Wikipedia, Reddit, message boards, and every other corner of the internet. And that doesn’t signify that the model understands meaning.”

Humans are rather easily fooled by chatbots, computer programs designed to imitate human speech. The first chatbot was a program called ELIZA developed in the 1960's by Joseph Weizenbaum. The program was designed to imitate a psychoanalyst. ELIZA used simple programming tricks. For example, if someone typed a statement with a form such as "I am bothered by X," ELIZA might ask a question such as "How long have you been bothered by X?" or "Why do you think you are bothered by X?"

Weizenbaum experimented with ELIZA by having people type on a computer terminal, interacting with an unseen agent that could have been either a real person or a mere computer program. Weizenbaum was surprised to find that a large fraction of the people interacting with the ELIZA program thought that they were conversing with a real person. At the time computer programming was in a very primitive state. The lesson was clear: even some rudimentary programming tricks can be sufficient to fool people into thinking that they are talking to a real person, when they are merely talking to a chatbot (a computer program designed to imitate human speech).

Now software is far more advanced, and we have systems that make ELIZA look very primitive in comparison. One type of chatbot is the experts system chatbot, which has been well-trained in some very specific knowledge domain. A person talking to such a chatbot may be convinced he is talking to someone who really understands the subject matter involved. For example, if you talk to a podiatrist chatbot, the program may seem to know so much about foot health problems that you might swear you are talking to someone who really understands feet. But whenever there is a very limited knowledge domain, thousands of hours of computer programming can be sufficient to create an impression of understanding.

Then there are what we may call general knowledge chatbots. Such programs are trained on many thousands of hours of online conversations between real humans. After such training it is relatively easy for a program to pick up response rules from pattern matching.

I will give an example. The game *Elden Ring* is currently very popular, largely because of its wonderful graphics. Imagine if you train your pattern-matching chatbot AI software to eavesdrop on thousands of conversations between young men, and there occurs many an exchange like this:

Human #1: So, dude, you played any good PS4 or X-box games recently?

Human #2: Yeah, I'm playing *Elden Ring*. Man, the graphics are out-of-this world! But it's freaking hard. You gotta earn so many of these "rune" things.

A visual from the "Elden Ring" game

After training on many conversations that included an exchange like this, our AI chatbot pattern-matching software picks up a rule: when you are asked about good recent PS4 or X-box games, mention *Elden Ring*, and mention that the game has great graphics, but is hard to play. Through similar training, the AI chatbot pattern-matching software picks up thousands of response rules, which can change from month to month. A person interacting with the software will be very impressed. For example:

- Ask the software about computer games, and it will talk about whichever game is now popular, and say the things people are saying about that game.
- Ask the software about TV shows, and it will talk about whatever shows are the most popular, and will say the kind of things people are saying about such shows.
- Ask the software about recent movies, and it will talk about whatever movies are the most popular, and will say the kind of things people are saying about such movies.
- Ask the software about celebrities, and it will repeat whatever celebrity gossip is making the rounds these days.
- Ask the software about its politics, and it will say whatever political sentiments are the most popular in recent days.

With such powerful pattern-matching going on, it's all too easy to be fooled into thinking you are chatting with someone with real understanding about a topic. In fact, the software has zero understanding of any of the topics it is talking about. For example, a well-designed pattern matching software trained on thousands of hours of conversations about baseball may end up sounding like someone who understands baseball, even though the software really doesn't understand the slightest thing about baseball.

Psychology professor Gary Marcus states the following:

"Neither LaMDA nor any of its cousins (GPT-3) are remotely intelligent. All they do is match patterns, drawn from massive statistical databases of human language. The patterns might be cool, but language these systems utter

doesn't actually mean anything at all. And it sure as hell doesn't mean that these systems are sentient. Which doesn't mean that human beings can't be taken in. In our book Rebooting AI*, Ernie Davis and I called this human tendency to be suckered by The Gullibility Gap — a pernicious, modern version of* [*pareidolia*](), *the anthromorphic bias that allows humans to see Mother Theresa in an image of a cinnamon bun....To be sentient is to be aware of yourself in the world; LaMDA simply isn't. It's just an illusion, in the grand history of ELIZA, a 1965 piece of software that pretended to be a therapist (managing to fool some humans into thinking it was human), and Eugene Goostman, a wise-cracking 13-year-old-boy impersonating chatbot that won a scaled-down version of the Turing Test....What these systems do, no more and no less, is to put together sequences of words, but without any coherent understanding of the world behind them, like foreign language Scrabble players who use English words as point-scoring tools, without any clue about what that mean."*

Imagine if someone could get silicon computers to really understand things. Then we would very soon see computer systems that did not just sound as smart as humans, but which sounded much smarter than humans. Since you can connect together thousands of computer CPUs without any limitation such as the limitation of fitting within a skull, once truly comprehending computers had been invented, we would soon see computers speaking ten times more intelligently than humans or a hundred times more intelligently than humans. But you will never see that. All you will ever see is chatbots that use pattern matching well enough so that they sound like humans of average intelligence, when asked average questions. And such chatbots won't even perform well when asked subtle rarely-asked questions using words that have multiple meanings. For example, if you mention that there are three types of Mustangs (a mustang horse, a Ford Mustang car, and a P-51 Mustang fighter-bomber plane), and you ask how well each type can fit inside each other, or ask whether each type could be disassembled and then successfully reassembled, or how well each type could be made without human assistance, a chatbot will "flame out and crash" like a P-51 Mustang shot down by an anti-aircraft gun.

at June 19, 2022 No comments:

Labels: AI

Sunday, June 12, 2022

11Authorities Seem to Realize That "Your Brain Is a Computer" Is a Junk Metaphor

Biologists have long been guilty of passing off dubious metaphors. For example:

(1) Observing the wonders of biology, and having no explanation other than a survival-of-the-fittest effect, biologists have made claims such as "natural selection is an engineer" or "natural selection is a tinker." An engineer is a human who conceives complex ideas about designs that can be implemented. A tinker is usually a person who willfully attempts to improve an existing design by experimental trial and error. A blind natural process having no will, mind, goal or motivation cannot accurately be compared to either an engineer or a tinker; and since such a process does not involve actual selection or choice, it is misleading to describe it with the phrase "natural selection."

(2) Observing DNA molecules that are mere repositories of low-level chemical information such as which amino acids make up particular protein molecules,

quite a few biologists have used misleading metaphors in which DNA is compared to a blueprint or a recipe for making an organism. Because it does not specify the anatomical structure of an organism or any of its organs or any of its cells, the "DNA as blueprint" metaphor is profoundly misleading. How a speck-sized ovum is able to progress to become a full-sized human baby is a wonder of origination far beyond the understanding of today's scientists.

(3) Observing brains that lack some of the main characteristics of computers (such as software, an operating system, and any known facilities for reading and writing new learned information), biologists have repeatedly claimed that the brain is like a computer. Very strangely, this metaphor is offered to try to explain how humans have minds, as if those advancing the metaphor failed to realize the gigantic shortcoming that computers don't have minds, don't have selves, and don't have consciousness. How can anyone think you can explain a mind and a self and a consciousness by using some metaphor refererring to something (a computer) that is mindless and selfless, without any consciousness?

Recently at the physics paper server we have a book-length paper by 11 authorities, one entitled "In search for an alternative to the computer metaphor of the mind and brain." The paper consists of different experts expounding on how "your brain is a computer" fails as a metaphor. A series of experts is asked four questions:

(1) What do we understand by the computer metaphor of the mind and brain?

(2) What are some of the limitations of this computer metaphor?

(3) What metaphor should replace the computational metaphor?

(4) What metaphor should replace the computational metaphor?

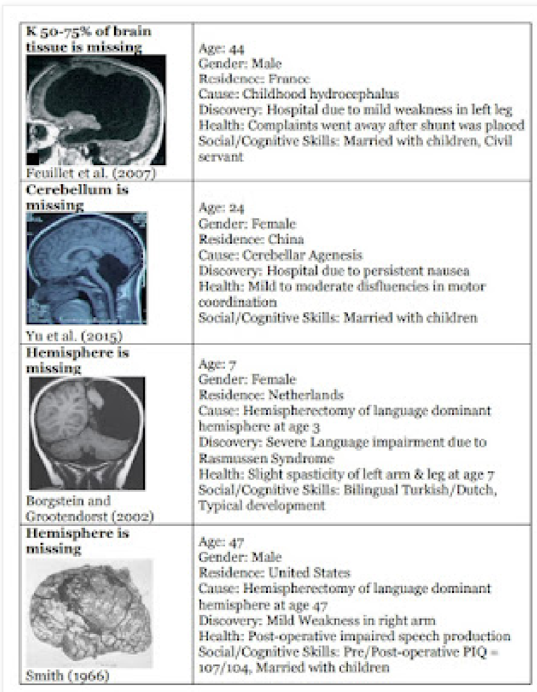
After a section by Madhur Mangalaml and Damian G. Kelty-Stephen in which they state that "attempts to explain human intelligence by referring to an anatomical organ as an entity that 'computes' is likely a case of circular reasoning," we have a section in which the same authors advocate a replacement metaphor of a cascade, making the strange claim that "a hierarchical configuration of events nesting at multiple scales achieves adaptive, context-sensitive behavior through a balance of noise and order." Then we have Paul Cisek offer a replacement metaphor of the brain as a "control system." Then we have Benjamin De Bari and James Dixon giving us a silly classification scheme in which organisms are classified as examples of "dissipative systems." It's more shrink-speaking reductionism in which humans are described like they were some mere physics process.

Then we have Luis H. Favela who makes this assessment of the lack of very notable progress in the heavily-funded Human Brain Project:

"At eight years in, HBP leadership published a list of the project's six most impressive achievements (Sahakian et al., 2021). These include a human brain atlas visual data tool, touch-based telerobot hand, neuro-inspired computer, and being cited in 1,497 peer-reviewed journal articles. There should be no doubt that much of this research is impressive, particularly when put into various contexts, such as the potential for advancing robotic limbs to improve the lives of people who have had amputations. However, it is far from clear whether any of these achievements have illuminated our understanding of brains and minds in a significant way."

The high point comes in the discussion by Fred Hasselman in Section 6.2 (page 69). Hasselman refers us to these neuroscience case histories:

"When MRI scans of the brain show a large black hole inside the skull of a patient, indicative of a liquid occupying 50 –75% of the volume that typically contains vast amounts of interconnected neurons, anyone would be surprised to learn the patient is an otherwise healthy 44-years-old French civil servant, married, with children (Feuillet et al., 2007). In China, a 24-year-old woman, married with a daughter, went to a hospital because of persisting nausea and was found to be the 9th recorded case of Cerebellar agenesis: her cerebellum was missing completely (Yu et al., 2015). Due to Rasmussen syndrome, a 3-years-old Dutch girl underwent surgery to remove her language dominant hemisphere. This chronic focal encephalitis had caused a severe regression of language skills, but at age seven, except for slight spasticity of the left arm and leg, she is living an everyday life and is fully bilingual in Turkish and Dutch (Borgstein and Grootendorst, 2002)."



K 50-75% of brain tissue is missing Feuillet et al. (2007)	Age: 44 Gender: Male Residence: France Cause: Childhood hydrocephalus Discovery: Hospital due to mild weakness in left leg Health: Complaints went away after shunt was placed Social/Cognitive Skills: Married with children, Civil servant
Cerebellum is missing Yu et al. (2015)	Age: 24 Gender: Female Residence: China Cause: Cerebellar Agenesis Discovery: Hospital due to persistent nausea Health: Mild to moderate disfluencies in motor coordination Social/Cognitive Skills: Married with children
Hemisphere is missing Borgstein and Grootendorst (2002)	Age: 7 Gender: Female Residence: Netherlands Cause: Hemispherectomy of language dominant hemisphere at age 3 Discovery: Severe Language impairment due to Rasmussen Syndrome Health: Slight spasticity of left arm & leg at age 7 Social/Cognitive Skills: Bilingual Turkish/Dutch, Typical development
Hemisphere is missing Smith (1966)	Age: 47 Gender: Male Residence: United States Cause: Hemispherectomy of language dominant hemisphere at age 47 Discovery: Mild Weakness in right arm Health: Post-operative impaired speech production Social/Cognitive Skills: Pre/Post-operative PIQ = 107/104, Married with children

A table from the paper

Hasselman gives a reference to a paper by Marek Majorek, which cites a page from *The Lancet* of 9 February 2002. We see a picture of a girl lacking almost half of her brain. The picture caption (from *The Lancet*) reads this:

"This 7-year-old girl had a hemispherectomy at the age of 3 for Rasmussen syndrome (chronic focal encephalitis). Incurable epilepsy had already led to right-sided hemiplegia and severe regression of language skills. Though the dominant hemisphere was removed, with its language centres and the motor centers for the left side of her body, the child is fully bilingual in Turkish and Dutch, while even her hemiplegia has partially recovered is only noticeable by a slight spasticity of her left arm and leg. She leads an otherwise normal life."

Referring to operations removing half of a brain to treat very severe recurrent seizures, Hasselman then states this: "Vining et al.(1997) studied the burden of illness in 58 children who had undergone hemispherectomy due to various kinds of debilitating afflictions of the brain and, remarkably, found that most children were better off with half a brain: 'We are awed by the apparent retention of memory after removal of half of the brain, either half, and by the retention of the child's personality and sense of humor.' " Hasselman mentions appeals to "youthful brain plasticity" as an explanation for such retention, something which makes no sense. If memories are stored in the brain, you should lose half of those memories if half of the brain is removed, and no conceivable amount of "plasticity" or "adaptability" could explain the retention of such memories. Hasselman states this:

"Consider the case of E.C., a 47-year-old right-handed, right-eyed patient who had his left (language) dominant cerebral cortex removed (Smith, 1966). E.C. had a pre-operative performance I.Q. (WAIS) of 108. Seven months after his dominant hemisphere was removed, his performance I.Q. was 104. He scored 85 out of 112 items correct on a verbal comprehension test. One would expect that removing a hemisphere storing many decades of unique traces of experienced events would scale to a much larger effect on I.Q. and cognitive ability."

Hasselman proposes a hypothesis of "Radical Embodied Cognition" in which "a massively redundant reality exists that is composed of many nested spatial and temporal scales on which physical processes interact by exchanging energy, matter and information." Later we have a writer who lectures us about resonances in the brain, and an expert who argues the obscure idea that the brain is a "fractal antenna."

All in all, the paper gives us a further basis for drawing this conclusion: claims that your brain is a computer are futile and fallacious. Such claims are fallacious partially because the brain has nothing like seven things that a computer uses to store and retrieve information (as discussed here).

To the contrary, there are the strongest reasons for thinking that brains cannot possibly be the cause of lightning-fast human thinking and memory recall. They include the following:

- The fact that no one has the slightest idea of how any arrangement of neurons could ever cause the arising of abstract ideas.
- The fact that severe slowing factors (involving things such as cumulative synaptic delays) and many types of severe signal noise should make it impossible for brains to produce the instant accurate recall routinely occurring in humans and the lightning fast accurate thinking that occurs in people such as math savants who can produce very complex calculations with astonishing speed.
- The fact that unreliable synaptic transmission (occurring with less than 50% reliability in a chemical synapse) should make accurate memory recall and very accurate thinking impossible, contrary to the reality that humans such as Hamlet actors can recall large bodies of text with perfect accuracy, and other humans can do very complex mental calculations "in their head" with perfect accuracy.
- The fact that not the slightest sign can be found of human learned information by microscopically examining brain tissue, and the fact no one even has a workable detailed theory of how human learned information (such as facts learned in school) could be translated into neural states or synapse states.

Trying to prove the brain is a computer is a futile, because if you were to prove such a thing, you would not explain consciousness and self-hood.

Computers don't have selves, and are no more conscious than a stone.

Although they all still seem to prefer the idea that the brain is the source of the mind, the 11 paper authors have mentioned many observations that undermine such a claim and conflict with it. Had the authors been willing to touch upon the abundant evidence for observations of the paranormal (such as evidence for out-of-body experiences during cardiac arrest when the brain has shut down), they could have mentioned many additional observational facts that undermine claims that the brain is the source of the human mind.

I will end with a quote from one of the papers cited by the paper I have discussed, a paper by Marek Majorek. He states this:

"It appears that the theory that electrical impulses recorded in the brain are traces of 'information processing' taking place within individual neurons and/or in neuronal assemblies, and ultimately leading to the emergence of consciousness in its varied and rich facets, is a fairy tale. There was a time, not very long ago, when serious scientists of the period adhered to the doctrine of abiogenesis, i.e. were convinced that life can arise spontaneously from inorganic matter. Not only did the great, but from today's perspective rather ancient, Aristotle think that it was a 'readily observable truth' that aphids arise from the dew which falls on plants, fleas from putrid matter, mice from dirty hay, crocodiles from rotting logs at the bottom of bodies of water, and so on (cf. Lennox, 2001), but still in the seventeenth century Alexander Ross wrote: 'To question [spontaneous generation] is to question reason, sense and experience. If he doubts of this let him go to Egypt, and there he will find the fields swarming with mice, begot of the mud of Nylus, to the great calamity of the inhabitants' (Ross, 1652). We know better today, of course. It seems justified to claim that currently widespread beliefs attempting to interpret consciousness as a form of emergent property of purely physical systems are just as deeply mistaken about their subject matter as the beliefs of abiogenists concerning the origin of living organisms were about theirs. Just as mice cannot arise of the mud of the Nile, so consciousness and other more complex mental phenomena cannot arise from the 'mud' of the firings of neurons in the brain. Thus the question, 'Where can it arise from?' imposes itself on us with renewed urgency."

at June 12, 2022 3 comments:

Labels: "brain as computer" metaphor

Friday, June 3, 2022

Studies Debunk Hippocampus Memory Myths

Neuroscientists have often made the claim that the hippocampus is necessary for the formation of new memories. For example, one paper claimed that "clinical evidence indicates that damage to the hippocampus produces anterograde amnesia." Anterograde amnesia is an inability to form new memories. There was never any good evidence for such claims.

To back up claims such as the one above, some people cite the case of patient H.M, a patient with a damaged hippocamous. For example, the paper quoted above states that patient H.M. "became unable to consciously recollect new events in his life or new facts about the world." This is not entirely correct. A 14-year follow-up study of patient H.M. (whose memory problems started in 1953) actually tells us that H.M. was able to form some new memories. The study says this on page 217:

"In February 1968, when shown the head on a Kennedy half-dollar, he said, correctly, that the person portrayed on the coin was President Kennedy. When asked him whether President Kennedy was dead or alive, and he answered, without hesitation, that Kennedy had been assassinated...In a similar way, he recalled various other public events, such as the death of Pope John (soon after the event), and recognized the name of one of the astronauts, but his performance in these respects was quite variable."

It is not scientific to cite a patient with one physical issue and some other problem, and to claim or insinuate that the problem was caused by the physical issue. Using the same logic, you could take someone with hair loss and a problem concentrating, and claim that the problem concentrating was caused by the hair loss. Ideas about a cause of something can only be soundly derived from studies involving many patients, not just one or a few.

The main research paper on the hippocampus and memory is the paper "Memory Outcome after Selective Amygdalohippocampectomy: A Study in 140 Patients with Temporal Lobe Epilepsy." That paper gives memory scores for 140 patients who almost all had the hippocampus removed to stop seizures. Using the term "en bloc" which means "in its entirety" and the term "resected" which means "cut out," the paper states, "The hippocampus and the parahippocampal gyrus were usually resected en bloc." The paper refers us to another paper describing the surgeries, and that paper tells us that hippocampectomy (surgical removal of the hippocampus) was performed in almost all of the patients.

The "Memory Outcome after Selective Amygdalohippocampectomy" paper does not use the word "amnesia" to describe the results. That paper gives memory scores that merely show only a modest decline in memory performance. The paper states, "Nonverbal memory performance is slightly impaired preoperatively in both groups, with no apparent worsening attributable to surgery." In fact, Table 3 of the paper informs us that a lack of any significant change in memory performance after removal of the hippocampus was far more common than a decline in memory performance, and that a substantial number of the patients improved their memory performance after their hippocampus was removed.

A 2020 paper is entitled "Preserved visual memory and relational cognition performance in monkeys with selective hippocampal lesions." The paper states this:

"We tested rhesus monkeys on a battery of cognitive tasks including transitive inference, temporal order memory, shape recall, source memory, and image recognition. Contrary to predictions, we observed no robust impairments in memory or relational cognition either within- or between-groups following hippocampal damage."

Citing a previous study, the paper notes that "formation of new memories in the object-in-scene task, one of the most accepted tests of episodic memory used with nonhuman primates, was found to be unaffected by lesions of the hippocampus itself." It also notes that "There is a concerning lack of clear causal evidence for a critical role of the hippocampus in visual memory, episodic memory, recollection, or relational cognition in nonhuman primates."

To test the effects of hippocampus damage, the study authors injected five rhesus monkeys with neurotoxins. They estimate that this damaged about 75% of the hippocampus structures of the monkeys (Figure 1). The monkeys were subjected to a wide variety of cognitive tests. The paper concludes this:

"Contrary to dominant theories, we found no evidence that selective hippocampal damage in rhesus monkeys produced disordered relational cognition or impaired visual memory. Across a substantial battery of cognitive tests, monkeys with hippocampal damage were as accurate as intact monkeys and we found no evidence that the two groups of monkeys solved the tasks in different ways."

These results were similar to those reported by the paper here, entitled "Nonnavigational spatial memory performance is unaffected by hippocampal damage in monkeys." The study states the following, noting that the monkey that performed the best on one memory test was in the group of hippocampus-damaged monkeys, not the control group of normal monkeys:

"Hippocampal damage did not reduce memory span or slow acquisition. Monkeys with hippocampal damage and control monkeys did not differ in the memory span they achieved during training (mean: HP = 4.4, C = 3.8; median = 4 for both groups; t8 = 1.09, p = .305). The monkey that progressed to the longest memory span (6) was in the hippocampal group (Table 1)."

at June 03, 2022 4 comments:

Labels: hippocampus

Wednesday, May 25, 2022

Seven Things in Fast Retrieval Systems, None of Which Your Brain Has

Humans manufacture various types of fast-retrieval systems, such as computers and books. A simple book with page numbers and an index is a fast-retrieval system, allowing you to get information about some topic very quickly. Below are seven things typically found in fast-retrieval systems.

Characteristic #1: Addressing or Position Notation

Addressing is some setup where particular spots in a system have addresses or coordinates. In a book addressing is implemented as page numbers. Without such page numbers, you could never use the index of a book to very quickly find information in the book. The index of the book only works when there are numbered pages that the index can refer to. Computers also use an addressing or position notation system. Every little spot on a computer's hard drive has an address or positional coordinate that can be used internally by the computer.

Conversely, brains have no addressing system, no position notation system, and no coordinate system. Neurons don't have neuron numbers or neuron coordinates, and synapses don't have synapse numbers or synapse coordinates.

Characteristic #2: Indexing

Indexing is some setup that allows a fast retrieval of information using addresses or coordinates or numbered positions. An index typically uses a sorted list. For example the index of a book contains a sorted list of topics in the book, with a page number or page numbers next to each of the topics. Computers also use indexing, and online services such as Internet search engines make very heavy use of databases that rely heavily on indexes.

Conversely, there are no indexes in the brain.

Characteristic #3: Sorting

Sorting is used in indexes, but sorting can be used by itself to allow fast retrieval of information. When I was a boy long before the Internet was invented, a key resource I used was a multi-volume encyclopedia set such as the Encyclopedia Brittanica. The set consisted of many volumes, with the first volume covering topics beginning with A, and the last volume covering topics beginning with Z. Each volume was alphabetically sorted. So, for example, in the A volume the article on aardvarks came near the beginning, and the article on the Aztecs came near the end. With such a sorted arrangement of topics, it was easy to quickly find information on almost any topic. Computers also make use of sorting to allow quick retrieval of information.

Conversely, there is no sorting going on in the brain. Neurons and synapses have fixed positions in the brain. There is no way for a brain to sort its neurons or synapses, and no sign that any brain components are sorted.

Characteristic #4: A Nondestructive Position Focus Mechanism

A position focus mechanism is some mechanism allowing information to be read from some position that is the current reading position that can be changed. The setup of a book (with a binding and many pages) allows a nondestructive position focus. You simply open the book to one of its pages, and that is the current reading position. Computers with hard drives also use a position focus system. They have a read/write head that can be moved to a spot on a spinning disk. That spot is the current reading position. A good position focus mechanism is one that is nondestructive, allowing you to move to any reading position without damaging information in the system.

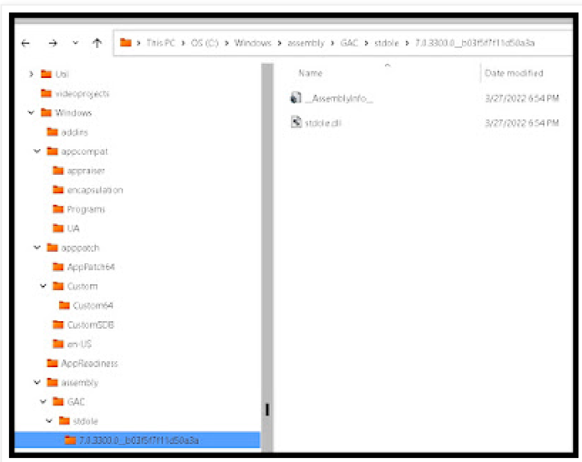
We can imagine information storage systems that would fail to have a nondestructive position focus mechanism. You could write information on all the dried leaves in your backyard. But then if you tried to read from some particular position, you would have to step on many leaves, and mess up the information in them. Or, you could write very much information using your fingers, on the wet sand of a beach. But if you were to try and read from a particular spot, you would walk over the lines, and destroy some of the information. Similarly, it would not work to store information by putting pages in a big bag. There would be no position focus mechanism allowing a fast retrieval.

Brains have no known position focus mechanism. There is nothing like a neural cursor that travels from one position in the brain to another, implementing something like a current reading position. There is nothing in the brain like a read/write head of a computer. Eyes have a physical mechanism allowing them to focus on one particular spot, but there is no sign in the brain of any mechanism allowing a physical focus to occur on one small set of neurons, something like a position focus mechanism.

Characteristic #5: Hierarchical Organization

In something like a printed encyclopedia set, information is stored using a hierarchical organization. The organization goes like this: pixels are organized into characters, which are organized into words, which are organized into sentences, which are organized into paragraphs, which are organized into topic articles, which are organized into volumes. Such an organization facilitates the fast retrieval of information.

Something rather similar goes on in computers. Computers use a folder system or directory system that can be hierarchically organized. So, for example, in the screen shot below we see a file called stdole.dll that is in the subdirectory within an stdole directory that is within a GAC directory that is within an assembly directory that is within a Windows directory. When there are very many files on a computer, it is much faster to find files with such a hierarchical organization than if all of the files were in the same directory or folder.



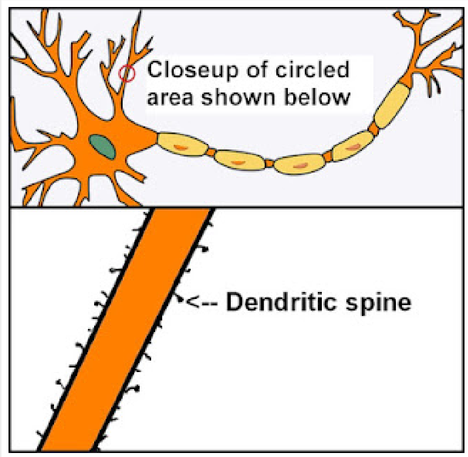
Conversely, there is no sign that brains store information using hierarchical organization. We can see no signs of a hierarchical organization of neurons or a hierarchical organization of synapses.

Characteristic #6: Places for Permanently Storing the Fast-Retrieved Information

Fast-retrieval systems such as books and computers have places for permanently storing information. The printed pages of a book will store information for more than a century. A computer will store information for many years, even if the power is turned off.

Conversely the brain seems to have no place suitable for the storage of fast-retrieved information. The main theory of memory storage in the brain is that memories are stored in synapses. But synapses are physically unstable. On a molecular level, the proteins that make up synapses are short-lived, having average lifetimes of two weeks or shorter.

On a larger structural level, synapses are unstable. Synapses are so small that it's almost impossible to track the lifetime of an individual synapse. But we know that synapses are attached to larger units called dendritic spines, rather like sewer lines or electrical lines are attached to a house. Dendritic spines are large enough to be observed with high-powered microscopes. Such observations tell us that dendritic spines are pretty short-lived.



Dendritic spines last no more than a few months in the hippocampus, and less than two years in the cortex. This study found that dendritic spines in the hippocampus last for only about 30 days. This study found that dendritic spines in the hippocampus have a turnover of about 40% each 4 days. This study found that dendritic spines in the cortex of mice brains have a half-life of only 120 days. The wikipedia article on dendritic spines says, "Spine number is very variable and spines come and go; in a matter of hours, 10-20% of spines can spontaneously appear or disappear on the pyramidal cells of the cerebral cortex." Referring to i*n vivo* observations of dendritic spines in the mouse hippocampus, the paper here says the authors "measured a spine turnover of ~40% within 4 days." The 2017 paper here ("Long-term in vivo imaging of experience-dependent synaptic plasticity in adult cortex") found the following regarding dendritic spines in the cortex of rodents:

"About 80% of synapses were detectable for a day or longer; about 60% belonged to the stable pool imaged for at least 8 days. Even this stable pool was found to turn over, with only, 50% of spines surviving for 30 days or longer. Assuming stochastic behaviour, we estimate that the mean lifetime of the stable pool would be on the order of 120 days."

Because dendritic spines don't last for five years, we should conclude that synapses (typically attached to dendritic spines) don't last for five years. But humans can accurately remember things for 50 years or more.

Characteristic #7: Use of a General-Purpose Encoding System

Books and computers both use a general-purpose encoding system, capable of storing an almost infinite variety of information. In books the encoding system is the alphabet of a particular language. In computers the encoding system involves multiple protocols such as the ASCII protocol by which English characters are represented as decimal numbers, and a decimal-to-binary protocol by which decimal numbers can be represented as binary numbers such as 0000000000001110.

No one has ever discovered any type of general-purpose encoding system in the brain. The only known encoding system in the brain is the genetic code, a very limited type of encoding system under which certain triple combinations of nucleotide base pairs stand for particular amino acids. The same system is used in all parts of the body, including your feet. No one has ever discovered any type of encoding system by which something such as English text could be represented as stored information found in neural states or synapse states. No one has ever found a single English word or a single image stored in a brain after examining brain tissue with a microscope.

A scientific paper notes the lack of any encoded information permanently stored in synapses:

"Synapses are signal conductors, not symbols. They do not stand for anything. They convey information bearing signals between neurons, but they do not themselves convey information forward in time, as does, for example, a gene or a register in computer memory. No specifiable fact about the animal's experience can be read off from the synapses that have been altered by that experience."

Conclusion

The human brain bears no physical resemblance to a device for the fast retrieval of information, and has none of the main characteristics of systems that are devices for the fast retrieval of information. But we know that humans can retrieve information at instantaneous speeds. This is routinely shown on the show *Jeopardy*, where contestants retrieve information and speak an answer (stated in question form) pretty much the instant that the host finishes reading a question (stated in answer form). Any performer singing a Gilbert and Sullivan patter song will be retrieving information at a speed of roughly three words per second, and I can mentally recall some of their songs at a rate of five words per second.

Given the complete lack of any coordinate system or addressing system in the brain by which the exact locations of neurons can be specified, the brain can be compared to these things:
(1) the US phone system if no one's phone number had ever been published;
(2) a vast post office with countless post office boxes, none of them numbered;
(3) a city in which none of the streets were named, none of the buildings had an outside identifier, none of the apartments had apartment numbers, and none of the houses had street numbers.
(4) a vast library in which none of the books have titles on their covers, and none of the chapters have chapter titles.

Imagine how hard it would be in any of such things to navigate to a precise location -- a particular post office box, a particular phone, a particular chapter of a particular book, or a particular apartment. That's the kind of situation that should exist in a brain storing abundant memories, because there is no coordinate system in a brain, and neurons don't have neuron numbers or something like a brain longitude and latitude. Instantaneous recall of rarely recalled memories and rarely recalled facts should be impossible if our memories are stored in brains. The fact that we routinely perform such instantaneous recalls is strong evidence our memories are not mainly stored in brains.

The complete lack of any workable theory for how memory recall can occur so quickly is admitted by neuroscientist David Eagleman, who states:

"Memory retrieval is even more mysterious than storage. When I ask if you know Alex Ritchie, the answer is immediately obvious to you, and there is no good theory to explain how memory retrieval can happen so quickly."

I haven't even mentioned here very severe signal transmission slowness factors and cumulative synaptic delay factors (discussed here) which make an additional very strong reason for thinking that brains must be way, way too slow to account for instant memory recall. We don't think and recall at the speed of brains; we think and recall at the speed of souls.

at May 25, 2022 No comments:

Labels: brain shortfalls, memory recall, memory storage

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Head Truth

The huge case for thinking minds do not come from brains

Tuesday, May 17, 2022

Floundering Failure of Those Urging Neural Solutions to Mental Illness

About a week ago the Los Angeles Times had an interview with mental health expert Andrew Scull, one in which Scull calls attention to the huge failure of those trying to treat mental illness mainly through neural solutions such as alterations of brain chemistry. Scull claims that the director of the National Institute of Mental Health from 2002 to 2015 produced "uniformly dismal results." He cites a Wired interview in which that person (Tom Insel) made this confession: "I spent 13 years at NIMH really pushing on the neuroscience and genetics of mental disorders, and when I look back on that I realize that while I think I succeeded at getting lots of really cool papers published by cool scientists at fairly large costs---I think $20 billion---I don’t think we moved the needle in reducing suicide, reducing hospitalizations, improving recovery for the tens of millions of people who have mental illness.”

In that interview we read about how Insel is interested in monitoring people's online speech, to try to pick up signs of mental illness. We read this:

"*One of the first tests of the concept will be a study of how 600 people use their mobile phones, attempting to correlate keyboard use patterns with outcomes like depression, psychosis, or mania. 'The complication is developing the behavioral features that are actionable and informative,' Insel says. 'Looking at speed, looking at latency or keystrokes, looking at error---all of those kinds of things could prove to be interesting.'* "

So will Big Brother soon be monitoring your online speech, ready to report you to some mental-health monitoring authority if you are writing something that violates fluctuating norms of correct speech? That sounds very Orwellian.

In the LA Times interview, Scull blasts the mental health approach based on genetics and neural chemistry. Scull states the following:

*"People with serious mental illness live, on average, 15 to 25 years less than the rest of us, and that gap seems to be widening, not narrowing. While genetics and neuroscience have flourished within the confines of universities, **their therapeutic payoff has been minimal or nonexistent**. I’m a sociologist, so you may think I’m biased. Perhaps I am, but in my judgment, Insel’s fixation on biology and biology alone has been a profound error. It threatens to undermine the prospects for progress in the mental health arena. Unfortunately, it is the same approach that seems to dominate the thinking and priorities of his successor at NIMH [the National Institute of Mental Health], Joshua Gordon. Gordon is a neuroscientist whose own work, focused on neural activity in mice, and his appointment indicates that*

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the federal research enterprise will double down on neuroscience and genetics."

Scull describes some of the mistreatment of the mentally ill that occurred in the twentieth century by people convinced that mental illnesses were almost entirely matters of genetics and the brain:

"*Compulsory sterilization; removal of teeth, tonsils and internal organs to eliminate the infections that were allegedly poisoning their brains; inducing life-threatening comas with injections of insulin; subjecting them to multiple episodes of electroshock treatments day after day till they were dazed, incontinent, and unable to walk or feed themselves; damaging the frontal lobes of the brain, either with an instrument resembling a butter-knife or by using a hammer to insert an icepick through the eye socket and sever brain tissue: these were unambiguously, horrendous interventions."*

Great progress may be made in treating the mentally ill when we stop thinking of human beings as brains and bags of genes, and start thinking of human beings as souls and products of society, who can be helped mainly with social, educational, psychological, charitable and spiritual aid.

at May 17, 2022 No comments:

Labels: psychiatry

Tuesday, May 10, 2022

Saying Consciousness Is a Wave Function Collapse Is Like Saying Your Mind Is a Square Root

Anesthesiologist Stuart Hameroff has recently written an article with the title "Consciousness Is the Collapse of the Wave Function." The article is a rambling mishmash of physics, chemistry and neuroscience that completely fails to provide anything resembling a credible notion for how a brain could produce awareness.

Hameroff discusses a theory advanced about 20 years ago by him and physicist Roger Penrose, what is called the Orchestrated Objective Reduction theory. The theory has been basically ignored by the scientific world, and it rather seems that almost no one seems to believe in it other than Penrose and Hameroff. The theory claims that consciousness is produced by some tiny units called microtubules.

Microtubules are units inside neurons, and each neuron has many of them. The function of microtubules is known: they serve to provide structural support for a neuron, and also help transport chemicals. Claiming that they also provide consciousness rather reminds me of that classic Saturday Night Live sketch in which someone claims that his floor wax is also a dessert topping.

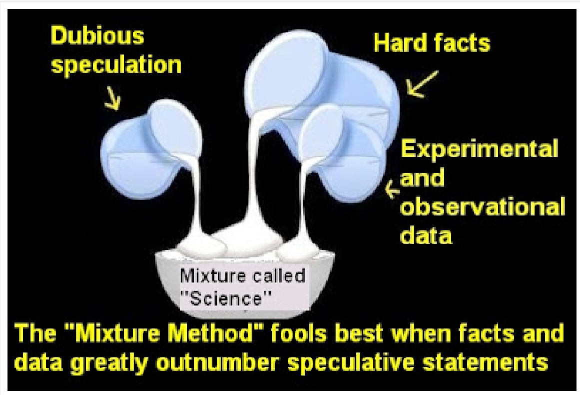
Hameroff makes the untrue claim that something has taken place to lend credibility to this theory. He states this:

"*Penrose suggested that wavefunctions collapse spontaneously and in the process give rise to consciousness. Despite the strangeness of this hypothesis, recent experimental results suggest that such a process takes place within microtubules in the brain."*

What are these recent experimental results? The article does not tell us. The article has no reference or link to any scientific paper. It merely has a link to a

Wikipedia.org article on something called superradiance, an article saying nothing about the mind or consciousness. Hameroff's claim that experimental results support his theory is untrue, and his failure to cite or link to such results suggests his statement is groundless.

The article is a classic example of using what I call the Mixture Method, a method I describe in my post "The Mixture Method Works Wonders When Selling Speculation as Science." The method consists of mixing up speculations with either scientific facts or mathematics or a combination of the two, usually in a way so that the speculative parts are a relatively small part of the paper or article. The goal is to kind of give a scientific flavor or a scientific sound to some claim that is speculative. Often the scientific facts cited are irrelevant to the speculations made, or have only a tangential relation to them.



A long section of Hameroff's article suggests that he is mainly just spouting irrelevant facts to give some scientific sound to his speculation. Beginning with his sentence "light is the part of the electromagnetic spectrum that can be seen by the eyes of humans and animals – visible light," and ending with his probably incorrect sentence "These micelles somehow developed into functional cells, and then multi-cellular organisms, long before genes," we have more than 500 words mentioning things that are all irrelevant to the claim made in his title, and all irrelevant to the issue of how people have consciousness. The discussion is a very jumbled hodgepodge of scientific facts and irrelevant observations, bouncing all over the place, going from the early universe to facts of chemistry to speculations about the origin of life to mention of mystical experiences. Irrelevant scientific facts are being cited at great length, to help give some scientific sound to some speculation that is metaphysical.

When you're following the mixture method, it helps if one of the scientific topics mentioned is an extremely obscure topic. That way you can mention some deep-sounding scientific topic, and people will probably fail to notice how such a mention is irrelevant to your speculation. The deep scientific topic mentioned is the collapse of the wave function. The wave function is some mathematical concept that comes up in the abstruse field of quantum mechanics. Supposedly a wave function "collapses" when a measurement is made of a particle such as a photon or an electron.

That has nothing to do with consciousness, and nothing to do with minds. When people try to drag the collapse of the wave function into a discussion of the origin of consciousness, what goes on seems to go like this:

(1) The hi-tech type of physicist measurement occurring when wave functions collapse is stretched a hundred-fold, into the more general idea of "observation."

(2) "Observation" is then conflated with "consciousness." But observation is not consciousness. Security cameras observe things, and they are not conscious. And unconscious automated equipment can measure things.

Using the term "it is becoming apparent" for something for which there is zero evidence, Hameroff states this: "It is becoming apparent that consciousness may occur in single brain neurons extending upward into networks of neurons, but also downward and deeper, to terahertz quantum optical processes, e.g. 'superradiance' in microtubules, and further still to fundamental spacetime geometry (Figure 1)." The figure 1 is a diagram that very strangely shows us columns consisting of (1) a neuron; (2) microtubules in a neuron; (3) hypothetical bumps in spacetime. What is this superradicance being talked about? Penrose refers us to a wikipedia.org article on that topic, but the article makes no mention of biology or the brain. It merely mentions high-energy physics sources of superradiance such as hot gases, and astrophysical sources of superradiance.

The paper "Superradiance -- The 2020 Edition" is a 261-page physics paper on the topic of superradiance. The paper makes no mention of the brain, no mention of neurons, and no mention of cells, but it does talk a lot about black holes. It seems Hameroff has no business mentioning superradiance to try to support the claim that consciousness is produced by microtubules.

Here's a reality check: it's dark as the dark side of Pluto inside brains and inside microtubules. A scientific article gives us the truth about radiance from cells:

"Cifra and colleagues cultured millions of yeast cells in a light-tight chamber. The signal detected using photomultiplier tubes tends to be extremely weak: A photon emitted every 15 minutes per cell..Cifra is cautious about concluding whether these ultraweak emissions—he prefers the term 'biological auto-luminescence'—play a significant role in biological signaling, or if they are simply by-products...From a theory standpoint, Cifra says, the signals are simply too low to be used for communication."

Even if superradiance were to be occurring in microtubules, it would do nothing to show that microtubules or brains produce consciousness. Radiance and superradiance are physics phenomena, not mind phenomena. While people refer to "light of the mind" or "the light of consciousness," or a "mental illumination," they are merely being metaphorical. Light is no more consciousness than heat is consciousness.

Hameroff states, "I agree that consciousness is fundamental, and concur with Roger Penrose that it involves self-collapse of the quantum wavefunction, a rippling in the fine scale structure of the universe." It seems that Hameroff is bouncing around between three different ideas:

(1) the idea that consciousness is produced by microtubules;

(2) the idea consciousness is the collapse of a wave function;

(3) The idea that consciousness is produced by a rippling in the fine scale structure of the universe.

These are three different ideas, all groundless. Which one does Hameroff believe in? Apparently all three, as if he can't make up his mind. It sounds like Hameroff can't get his story straight.

According to mainstream understanding of quantum mechanics, a wave function collapse occurs only upon observation or measurement. There are no observations or measurements occurring within microtubules. So in the context of mainstream quantum mechanics, talking about wave function collapses within microtubules doesn't make sense. Of course, you can always play around with unorthodox theories of quantum mechanics, but doing that has produced some of the silliest statements of modern scientists, such as Hugh Everett's bat-bleep-crazy theory of some infinity of parallel universes.

Penrose and Hameroff found it necessary to become quantum theory heretics, by postulating the speculative idea that wave functions spontaneously collapse (instead of only occurring during measurement or observation). Maybe their thinking was rather like this: wave function collapses as we now understand them occur only with conscious observers, so if wave functions spontaneously collapse, they would produce conscious observers. No, they would not. If such spontaneous wave function collapses occurred, it would merely mean we need to revise the current prevailing idea that wave function collapses only occur with observation. Similarly, the fact that car crashes only occur with drivers gives you not the slightest warrant for thinking that spontaneous car crashes not involving observers (like two unmanned parking lot cars colliding) would somehow conjure up the sudden appearance of car drivers.

Thinkers such as Hameroff try to suggest that there can be quantum effects in the brain, and that the brain can act like a quantum computer. Such insinuations are futile in explaining human awareness. Computers can compute, but they are not aware, and have no consciousness. You can't compute your way to consciousness. Also, it is completely erroneous to think that you can show a brain could compute by showing some brain tissue acts like computer hardware. Computing inside a computer requires not just hardware but also computer sofware. Brains have nothing like the software in computers that enables computation.

I can give some advice for people trying to make some progress in understanding the human mind:

(1) Don't just study microtubules, but study the entire brain, studying at great length exceptional case histories of minds that performed well even with very little brain, and studying at great length the topic of neural shortfalls, all the ways in which the brain fails to have the physical characteristics we would expect it have if it were the source of our minds and the storage place of our memories. You can get such information by reading the posts at this blog.

(2) Don't study quantum mechanics or high-energy physics when trying to clarify the human mind, but do make a very thorough study of human mental phenomena, including a long and thorough study of the evidence for psi and observational reports of seemingly paranormal and currently inexplicable human experiences such as near-death experiences, hypnotic phenomena and out-of-body experiences.

(3) Do not become a fan of any theory that takes the futile, dead-end approach of merely trying to explain "consciousness" (a bloodless, stripped-down term suitable for describing the mind of an ant), and recognize the necessity for explaining the full range of human mental phenomena, including memory, thinking, personality, belief, understanding, self-hood, creativity, and the many well-observed and carefully documented anomalous mental phenomena that our professors should be paying very close attention to but senselessly ignore.

A mind is so much more than just "consciousness"

at May 10, 2022 No comments:

Labels: orchestrated objective reduction theory, quantum mechanics

Wednesday, May 4, 2022

EEG Studies Fail to Provide Robust Evidence That Brains Think or Retrieve Memories

To try to provide evidence for their claims that memories are stored in the brain and that brains produce mental phenomena such as thinking and imagination, neuroscientists look for what they call neural correlates of mental activity. A neural correlate of a mental activity would be some sign that a brain acts differently or looks differently when someone does a particular type of mental activity such as thinking or recalling.

The most common way that a neuroscientist will look for a neural correlate of a mental activity is to image someone's brain while he is doing some mental activity, typically using an fMRI scanner. In my post "The Brain Shows No Sign of Working Harder During Thinking or Recall," I discussed the failure of such studies to provide robust evidence that brains produce thinking or recall. The following are tips for analyzing such studies:

(1) Search for the phrase "percent signal change" to quickly find out how much of a difference was found during some mental activity. A large fraction of all fMRI-based neural correlate studies will use such a phrase.

(2) Find out the sample size used, and whether a sample size calculation was used to determine whether the sample size was adequate. The vast majority of fMRI-based neural correlate studies fail to provide a sample size calculation, and the vast majority of such studies use way-too-small study group sizes, so small that they are not reliable evidence for anything.

What you will typically find is that such studies will show only extremely small changes in brain activity, involving changes of smaller than one half of one percent. Such variations of only about one part in 200 or smaller are no robust evidence that brains produce thinking or produce recall. We would expect to get variations of such a size given random moment-to-moment fluctuations in brains, variations that would occur even if a person was not thinking and not recalling anything. And the fact that the vast majority of fMRI-based neural correlate studies use way-too-small study group sizes means that such studies are not robust evidence of anything. As discussed here, a recent large study was announced with a headline of "Brain studies show thousands of participants are needed for accurate results," but a typical fMRI-based neural correlate study will not even use dozens of participants.

But there is an entirely different way in which neuroscientists can look for neural correlates of memory recall and thinking. Rather than using big fMRI machines to scan the brain, a neuroscientist can hook up brains to electroencephalography machines (EEG machines) that read electrical activity of the brain. To produce such readings, many different electrodes will be attached to the heads of subjects who are being tested. The output is not an image of the brain, but a reading showing lines that go up and down. A neuroscientist can study such lines, looking for some neural correlate of thinking or recall that shows up as a difference in a wiggly line.

Scientists studying such EEG outputs are looking for what they call an event-related potential or ERP. In theory an ERP is some EEG pattern that might be repeated whenever some mental event occurs such as recognition or recall or concentration. In the literature an ERP is typically described as some blip occurring over less than a second. Figure 5 of the paper here gives us a "heat map" of various claimed ERP effects relating to cognition. The claimed effects have various names listed on the right side of the heat-map, names such as N400 and CDA (standing for contralateral delay activity).

What typically goes on is a cherry-picking affair. A neuroscientist will typically use a type of EEG device with 128 electrodes, each of which is attached to a different part of the head. After the device records neural activity, there will be 128 different readings, each from a different part of the head. Each reading will be some long wavy line. Imagine a paper scroll about three inches high and 100 meters long, with a wavy line stretching from beginning to end, and you'll have a rough idea of the output from any electrode. Neuroscientists will not typically show us some graph showing the statistical average of all of these lines. Instead, they will be free to choose any group of electrodes, to try to show some correlation effect.

Imagine you are a neuroscientist. Did you fail to get any correlation effect from averaging the outputs from electrodes 98, 99, 100 and 101? Then you can just keep playing around with electrode combinations until you get something that looks like an effect. For example, maybe you'll get something that looks like an effect if you average the results of electrodes 34, 35, 37 and 38. If the studies were properly designed, using a pre-registration in which an exact methods description was published before data gathering, such dubious "slice and dice until you get a desired result" techniques would not be possible. But we almost never see any such pre-registration in these EEG neural correlate studies. Also, there's no rule that you cannot cherry-pick two or three electrodes that were not adjacent.

So, for example, in the study here in Figure 3 we have a diagram showing two graphs of nice-looking ERP effects. The caption tells us the first graph is from electrode 65, and that the second graph is from electrode 91. But Figure 2 shows that 128 electrodes were used, and that electrode 65 is on the other side of the head, nowhere close to electrode 91. Our authors have apparently cherry-picked the results from 128 electrodes, looking for the results that would best show the desired effect.

A scientific paper about the shortfalls of studies looking for these ERP effects tells us the following:

Were True

- "Brains Make Minds" Models All Flunk a Large Brain Scan Study
- The Philosophy of Teleospiritism
- The Biggest Blunders of Theories Such as Integrated Information Theory
- Study Finds No Robust Link Between Brain Structure and Personality
- The Two Huge Mistakes Involved in Typical Talk of a "Hard Problem of Consciousness"
- Neuroscientists Keep Wrongly Assuming the Source of Something Must Be Near Its Observed Manifestations
- The Vague Unfounded Boasts of Biology Sound Like the Vague Unfounded Boasts of Astrophysics
- 8 Reasons for Doubting Claims of the Heritability of Intelligence
- Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"
- Exhibit A Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- Exhibit B Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- More Indications Scientists Don't Understand How a Brain Could Think or Remember
- Studies New and Old Fail to Show a Big Link Between Brain States and Minds

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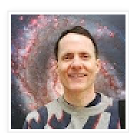

Mark Mahin

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March 2023 (2)

"An example of this issue is described in a recent paper by Luck and Gaspelin (2017), who demonstrated how 'researcher degrees of freedom' could influence statistical analysis of ERP data. ERP recordings typically employ dozens of electrodes and result in hundreds of time points, which results in an almost unlimited variety of possible data analysis approaches, and, consequently, in the probability of a false significant finding approaching certainty."

Many such studies have been done, but they have failed to produce any robust evidence that human brains produce memory recall or thinking. Let us look at some of these studies, and the results that have been claimed. I will use the "heat map" in Figure 5 of the paper here to select the best-reported claimed ERP effects for cognitive activity. According to that figure, the best-reported ERP effects relating to cognition are:

(1) A CDA or contralateral delay effect having something to do with memory;

(2) an FN400/N400 effect (also called an "ERP old/new effect) having something to do with recognition;

(3) an N170 effect having something to do with categorization;

(4) a P100 effect (also called a P1 effect) having something to do with attention.

It is claimed that an "ERP old/new effect" (apparently the same or similar to an FN400/N400 effect) is some EEG sign of recognition. Looking at the papers attempting to show this effect, we see nothing that looks very impressive. The claim is that when you have people look at some list of words that includes words they were asked to memorize and words they were not asked to memorize, that for only *about a fifth of a second* some type of brain wave looks slightly different when that wave is read from the parietal region of the brain.

No robust evidence has been provided for such an effect, because the study group sizes used in the studies claiming such an effect are too small. Even if such a fraction of a second effect was observed, it can be explained without assuming that a memory has been retrieved from the brain. When somebody recognizes something, there can be a kind of "aha" effect in which muscular responses differ very slightly. For example, after recognizing a face in the crowd, a person's facial expressions can be different than when encountering a stranger, with the difference lasting only an instant. Such a difference could easily be the explanation for some marginal fraction-of-a-second difference showing up in a reading of brain waves.

In one paper I read claiming to get this fraction of a second "ERP old/new effect," the instructions were for subjects to click an "Old" button if they recognized a word, and a "New" button if they did not. The instructions stated that the "Old" button should only be clicked if the subject was sure he had seen the word before. With such instructions, there easily could be a kind of momentary pausing effect when people thought they recognized a word, during which they were wondering whether they were sure about seeing the word before. Such a muscular pausing could be the cause of this fleeting "ERP old/new effect," with the effect having nothing to do with a difference in brain activity during recognition.

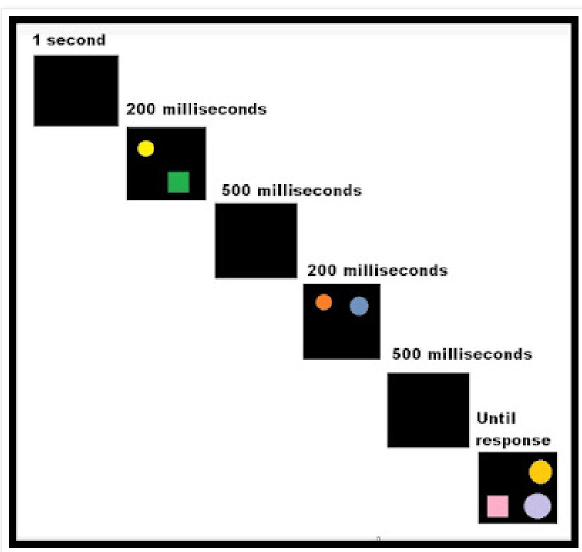
This "ERP old/new effect is apparently the same (or involves or is related to) something called the N400 response. A paper described it like this:

"*The N400 is a negative-going wave peaking at about 400 ms, whose amplitude is larger after presentation of a stimulus whose probability of occurrence is low within its semantic context (Kutas & Federmeier, 2011). For example 'He spread the warm bread with socks' would elicit a larger N400 than 'He spread the warm bread with butter" (Kutas & Hillyard, 1980).' "*

This is another alleged neural correlate of cognitive activity that can easily be explained purely by muscle activity having nothing to do with the mind. The person presented with some crazy sentence may have a different muscle response, perhaps a look of bemusement on his face, or a kind of "huh?" look on his face. Since the reported N400 response only involves a fraction of a second difference, we can't tell whether evidence is being picked up of brains thinking, or merely evidence of a tiny-bit different muscle response.

A meta-analysis of studies about this claimed N400 response tells us that the average number of subjects used is only about 15. Is such a sample size large enough? It is not, judging from the paper here. That paper is devoted to estimating how large a study group size would be needed to detect a particular ERP effect, one similar to the claimed N400 response and the claimed "ERP old/new effect." The paper tells us that to get a fairly good 80% statistical power would require at least "30– 50 clean trials with a sample of 25 subjects."

There's another claimed ERP effect called the contralateral delay effect or CDA. The effect is claimed to occur as a fraction-of-a-second blip when people are shown screens having colored circles or colored squared, and asked to identify whether a later screen matches the previous screen. Figure 1 of the paper here shows the type of screens shown. The visual below shows the kind of screens shown, and how long the inputs were shown.



After taking EEG recording of brain waves of people during such an activity, scientists have claimed that there is some distinctive blip that shows up (lasting only a fraction of a second), something they call a contralateral delay effect or CDA. It has been claimed that such an effect is a correlate of working memory. But since the alleged effect is extremely short-lived, it provides no

September 2018 (1)
August 2018 (1)
July 2018 (1)
June 2018 (1)
April 2018 (30)

Labels

- "brain as computer" metaphor
- academia dysfunction
- adult neurogenesis
- AI
- binary memory storage theory
- brain changes with age
- brain connectivity
- brain effect on personality
- brain imaging
- brain injury
- brain research projects
- brain shortfalls
- brain signal speed
- brain surgery
- brain uploading
- brain waves
- claims of mind reading by brain scans
- claims of neural correlates of mental activity
- COVID-19
- decisions
- default mode network
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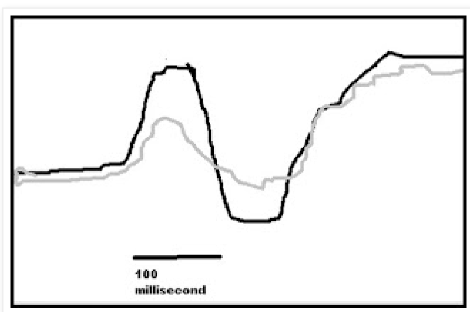
- exceptional memory
- exceptional speed of thinking
- file drawer effect
- fraud
- free will
- genes
- global workspace theory
- groupthink
- health hazards in neuroscience experiments
- hemispherectomy
- high mental function despite large brain damage

evidence that brains store memories. What is showing up could simply be related to vision or to some color persistence effect by which a perceived color will hang around in the mind or brain for a second or two.

It is well-known that there is something called an "afterimage," in which you can see something after you stopped looking at it. For example, the web page here has a photo of Amy Whitehouse that is strangely colored. Look at the dot at the center of the photo for 30 seconds, and then look to the blank white area to the right of the photo. You will then see a ghostly afterimage of Amy Whitehouse. Whatever that type of effect is, it isn't memory. It's just a "lingering of perception" thing. The claimed CDA effect may merely be picking up that type of short-term thing, not something related to a brain storage or retrieval of memories.

The N170 effect is some ERP effect supposedly produced when someone is shown a picture of a face. Referring to a mere fraction of a second, the wikipedia.org article on the effect claims that this alleged effects only lasts "130-200 msec after stimulus presentation." Figure 1 of the paper here has a diagram similar to the schematic diagram below, with the black line representing the response from seeing faces, and the gray line representing the response from seeing objects that are not faces.



This meta-analysis tells us that most of the faces used in studies of the N170 effect have involved emotional faces. The faces shown usually had expressions such as fear, disgust or joy. You can easily explain the fraction-of-a-second blip shown without imagining that viewing faces involves some recognition activity by the brain, and that all that is being picked up is a slight physiological response in regard to emotional stimulus. Studies of the N170 effect do not rule out some scenario like this:

(1) You see a face with an emotional expression, and your mind or soul (not your brain) recognizes the emotion.

(2) Seeing emotion on someone's face produces a slight physiological response, which shows up as a fleeting blip in brain waves.

The P100 effect (also called a P1 effect) is also some claimed small-fraction-of-a-second effect supposedly occurring for about 50 milliseconds when a person engages in visual selective attention, such as looking at only the left part of a screen. Eye muscles behave differently when you focus on only one side of a screen. Since such an instantaneous effect can easily be explained in terms of muscle activity involving the eyes, it provides no good evidence that brains are producing mental attention.

Nothing we have discussed provides any good evidence that brains produce thinking, that brains store memories, or that brains retrieve memories. What

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

kind of test can we imagine that would be a good test of such claims? The test might go something like this:

(1) Subjects wearing EEG electrodes on their head would be asked to look at photos displayed on a computer screen, with each photo shown for five seconds. Most of the photos would be photos of people who were not famous and could not be recognized. One third of the photos would be photos of famous people with neutral expressions, none of whom were scary or threatening. A computer program would assure a random shuffling of the photos.

(2) Subjects would be asked to remain motionless and expressionless. Subjects would be told to simply say in their mind (without speech) "Go" if they recognized the face, and "No" if they did not.

(3) Attempts would be made from reading brain waves to determine whether there was any correlation between the perception of recognized faces and the perception of faces that were not recognized.

Such a test would fail. No robust evidence would be found for a neural correlate of recognition.

I used the "heat map" in Figure 5 of the paper here to select the best-reported claimed ERP effects for cognitive activity. It is interesting what is not reported in that heat map. According to the map it seems:

(1) There are no strong ERP/EEG effects for learning.

(2) There are no strong ERP/EEG effects for decision making.

(3) There are no strong ERP/EEG effects for prediction.

(4) There are no strong ERP/EEG effects for executive function.

(5) There are no strong ERP/EEG effects for perception.

(5) There are no strong ERP/EEG effects for speech.

Overall, EEG studies fail to provide robust evidence that thinking or decisions or memory retrieval or memory storage occurs because of the brain. The shape-seeking scientists eagerly looking for these slight, fleeting blip effects in EEG lines can be compared to people eagerly scanning the clouds looking for shapes that resemble animals, to back up some belief that the ghosts of dead animals live in the sky.

The sample sizes used in these EEG/ERP studies are generally way too small to provide a robust evidence for a real effect. The headline of a news release of an important recent study is "Brain studies show thousands of participants are needed for accurate results." But these EEG/ERP studies typically involve only about 15 subjects per experiment. A huge defect calling into question the reliability of all such studies is that the researcher is free to scan the results from 120 electrodes, and cherry-pick the output from whatever few electrodes he finds most shows some sub-second effect that is being eagerly sought, doing additional cherry picking that involves looking for some one-second slice of time in which the effect will show the most. This is a recipe for "conjuring phantoms." Given such complete freedom to scan data looking for some fleeting blip in wavy lines, it is easy to find almost any imaginary effect you might be hoping to find. In general, the fleeting ERP blips that are found can be explained as brain involvement in muscle activity and physiological activity, without postulating that brains are the source of thinking and memory.

at May 04, 2022 No comments:

Labels: claims of neural correlates of mental activity, EEG studies

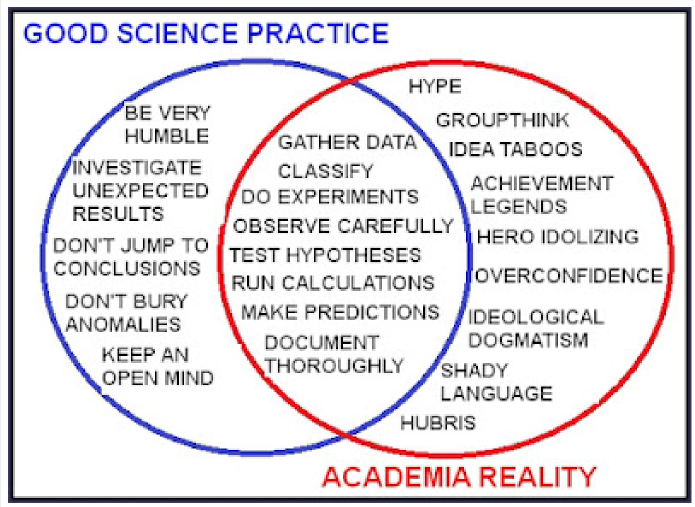
Tuesday, April 26, 2022

Principles of a Post-Materialist Science

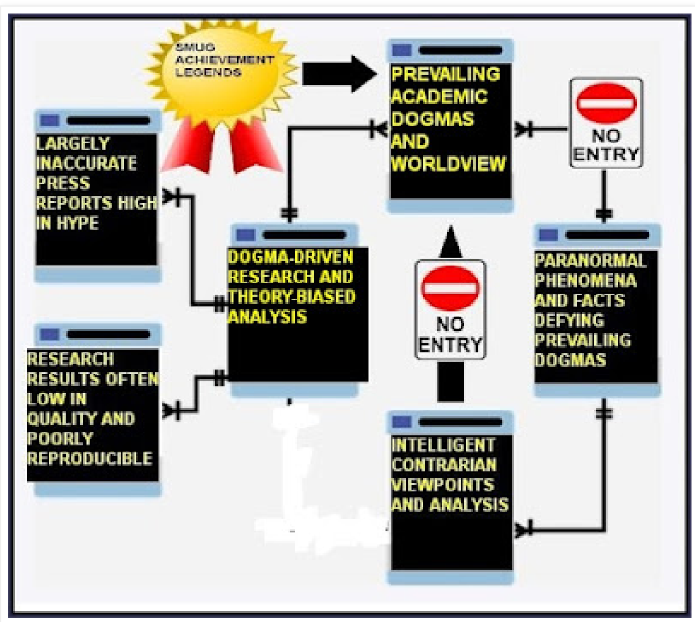
What we can call the Age of Materialist Science has given us a scientific academia landscape with the following dysfunctional features:

- People trained as scientists are coerced into accepting or paying lip-service to doubtful belief tenets such as the nonexistence of souls and spirits, the neural origin of all mental effects, and the accidental origin of all biological innovations, contrary to a vast number of facts and observations.
- Much of what is called science consists of the belief dogmas of a belief community, often ideas contradicted by much observational evidence, such as beliefs that human mental phenomena are purely brain effects.
- Scientists act like conformist members of a belief community, afraid to challenge belief dogmas that have become kind of sacred tenets in their community.
- Scientists are effectively encouraged to ignore a vast body of relevant observations of the paranormal, observations conflicting with the materialist belief tenets of the scientist's belief community.
- Much of the activity of scientists consists of doing poorly designed experiments trying to provide evidence for various beliefs prevailing in the scientist belief community.
- A system of peer review exists by which anomalous observations and contrarian analysis and heterodox viewpoints can be prevented from being published.
- Smug achievement legends are constantly repeated, even when they make no sense, such as the claim that a nineteenth century scientist did something to explain protein molecules and super-complex cells that he knew nothing about.
- Overconfidence, hubris and knowledge overestimation is systematically encouraged, along with absurd claims that scientists "pretty much understand" things that are a thousand miles over their head.

The diagram below contrasts principles of good science with the current tendencies of scientists in universities:



The diagram below gives us a rough sketch of what we have in the Age of Materialist Science:



Someday this very dysfunctional system may be replaced by something better. Below are some very rough thoughts about some of the principles that a reformed, post-materialist science might follow.

- Do not put any previous scientist on any kind of pedestal, or reverently attach special value to his thoughts and theories.
- Recognize the strong possibility of an observer getting novel and currently inexplicable observational results, and instead of ignoring such results, direct funding and attention to follow up on them.
- Make federally funded scientific research freely available to all, rather than hiding scientific work behind paywalls or in expensive journals that make the taxpayer pay again for research he already funded.
- Value all observations by previous careful observers, not dismissing such observations with excuses such as saying people believed the wrong things when the observations were made.

- Discourage inflexible and one-sided printed science textbooks, replacing them with electronic works that allow readers to add links and comments that draw attention to errors and omissions in the works, and draw attention to conflicting evidence and contrary viewpoints.
- Recognize that humans do not understand the deep mysteries of the origin of life, the origin of large organisms and the origin of minds, and be less generous in funding scientists spending most of their careers trying to bolster previous boasts claiming explanations for such things, while encouraging a critical analysis of their work.
- Do not ignore or dismiss repeatedly reported observational phenomena with a claim that the thing cannot be happening because it is impossible.
- Recognize that science is only one of quite a few important ways of reaching truth, acknowledging the equal importance of other paths such as logic, mathematics, history, scholarship and direct personal experience.
- Revise psychology textbooks and biology textbooks so that they discuss at length hard-to-explain or inexplicable human observations and anomalous experiences, rather than censoring and suppressing such observational reports.
- Follow the principle that when reliable observers frequently report specific kinds of observations of the inexplicable and anomalous, such observations should be given more attention rather than less attention.
- Recognize the high tendency of social structures such as universities and colleges to create conformist belief communities that may have a negative impact on scientific progress, and give rise to speech customs and belief traditions that masquerade as well-established science.
- Create a credential system where anyone who passes a very hard 3-hour test on some scientific subject can be certified as an expert on that topic, even if he has not passed through the conformity-creating system of colleges and universities.
- Create and fund alternative structures and organizations for learning and research separate from universities and colleges that have been so infected by conformist belief traditions, not as a replacement but as a rival and an alternative.
- Respect the observations of people who are not professional scientists, rather than having some snobbish elitist attitude that observations count for little unless they are made by professors or near-professors.
- Revamp the current university and college science instruction system, which suffers from an authoritarian teacher/follower model not varying much from the teaching model of two thousand years ago, replacing it with some model encouraging more dissent

and discussion of alternative viewpoints and evidence conflicting with predominant assumptions.

- Revamp or rethink the "one-to-many" model of collegiate classroom instruction which tends too strongly to produce a meek acceptance of ideology or dubious claims passed on by authorities.
- Replace in many university departments the current habit of giving someone with a master's degree a PhD based only on some very narrow research on one tiny topic, and make extremely broad multi-subject cross-discipline study the thing that gets you the PhD.
- Federally fund independent scientists with worthy research proposals, even those working outside of the university system.
- Have a large fraction of all federally funded scientific research approved by persons outside of academia, to help prevent "echo chamber maintenance" effects whereby some scientist belief community with "purse string" control keeps funding research designed to support its cherished beliefs.
- Create a system in which public comments can appear at the end of every online science paper, allowing the public to dispute poorly designed papers, discuss conflicting evidence, and dispute papers making claims not justified by anything in the paper.
- To discourage studies in which researchers feel free to slice and dice data in innumerable ways until they find something "statistically significant," create a pre-registration system for experimental studies, in which papers must only report on whether the results supported a previously announced hypothesis and whether the data collection and data analysis procedures followed matched a detailed experimental plan published before any data was collected. Also have a red-flag system whereby the reader is warned of the failure of an experimental paper to follow such a standard.
- Create sample-size calculation conventions and study-group-size standards that limit the proliferation of misleading experimental studies in which false alarms (easily explainable by chance effects) are heralded as scientific discoveries.
- Stop acting as if unintuitive principles not suggested by common experience (such as "everything must be explained by matter and energy" or "there cannot be mysterious unseen influences") should be preferred over intuitive principles suggested by common experience (such as "accidents don't produce complex inventions" and "where there's lot of smoke, there's probably fire," which is a good rule-of-thumb in dealing with whether observational reports suggest some underlying reality).
- Stop promoting scientists based on the number of papers they have published, and encourage alternate promotion criteria such as the number of times a scientist has published a paper judged to follow a "Best Practices" standard.

- End the current secretive peer-review system that acts as an ideological filter preventing dissenting viewpoints, reports of conflicting evidence, and novel observational reports, replacing it with a “let scientists stumble but flag their stumbles” system that will encourage public comments about any mistakes in a scientific paper, along with also a quality grading system whereby inferior papers can be low-graded.

- Stop making dubious claims of a scientific consensus that are not established by secret ballots of scientists, and create some system for secret balloting of scientists that will clarify how much they agree on opinions, a system that always offers a variety of belief answers including “I don't know.”

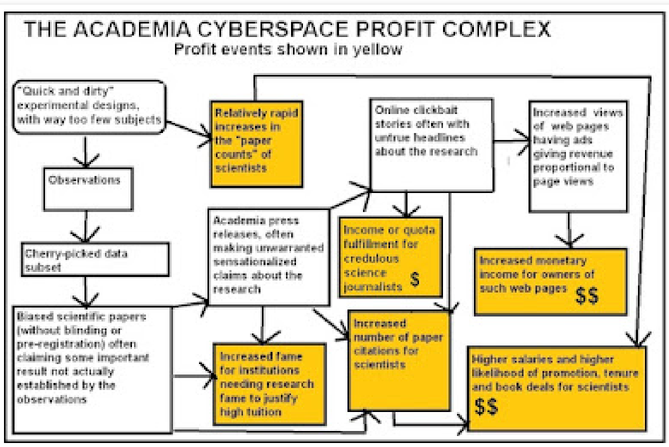
- Make a large fraction of all scientific funding go to studies that will be guaranteed publication studies in which publication is assured even if a null result is found.

- Make a small fraction of all scientific funding go to groups trying to disprove or falsify prevailing ideas and assumptions.

- Reform the speech and writing habits of scientists, to discourage the continuation of misleading speech practices and misleading visuals that are shockingly common in scientific literature.

- Stop referring to speculative unobserved things such as dark matter, dark energy and accidental macroevolution as "science," and accurately refer to them as "scientist speculations."

- Reform current profit structures that reward bad science and bad scholarship that ignores important relevant evidence, and create novel profit structures that reward best-practices science and scholarship that takes into account all relevant evidence.



The current profit structure is extremely dysfunctional

at April 26, 2022 No comments:

Monday, April 18, 2022

Why the "A Memory Is Stored Throughout the Brain" Idea Makes Things Much Worse

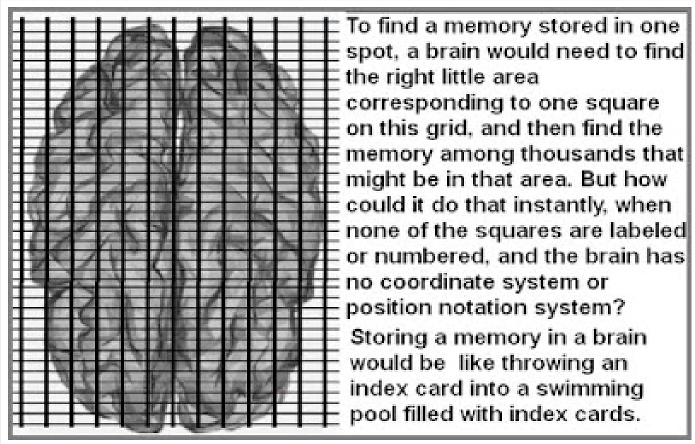
No matter what form such an idea takes, the idea that the human brain stores memories creates the most gigantic difficulties, difficulties so bad that we should reject all claims that memories are stored in brains. Let us look at two different forms of such an idea, and look at some of the difficulties that each form creates.

The most common form of the idea that brains store memories is the idea that a memory is stored in one particular little spot of the brain, with each memory being stored in a different tiny spot. Below are some (but not all) of the huge problems that such an idea creates:

(1) **The spot selection problem.** While computers have operating system algorithms for choosing a random storage spot, a brain would seem to have no method or capability of choosing one small little storage spot for a memory to be placed. So if, for example, we imagine that a brain placed a memory in storage spot number 263,432 out of 250,000 storage spots, we have the problem: why would that particular spot have been used to store the memory, and not some other spot?

(2) **The writing and encoding problem**. Once some spot had been selected for a memory to be written, something learned would have to be translated into neural states or synapse states and then written. There is no credible theory of how learned information or episodic memories could be translated into neural states or synapse states. There is no known mechanism in the brain for writing information. A computer has an operating system with formally designed encoding protocols such as the ASCII protocol and a protocol for converting decimal numbers into binary numbers. A brain has no such thing. A computer has a read-write head for writing information. The brain has no such thing.

(3) **The navigation problem.** Humans routinely display the ability to instantly recall learned information, given a name, date or image. So, for example, if you say "death of Lincoln," I will instantly be able to recite various facts about the death of Abraham Lincoln, such as that it occurred because John Wilkes Booth shot Lincoln through the back of his head at Ford's Theater in April, 1865. If we believe that a memory is stored in some tiny little spot in the brain, such as storage spot 186,395 out of 250,000, then we have the problem: how was the brain able to instantly find that exact tiny spot where the memory was formed? This difficulty is a "show stopper" for all claims that a memory is stored in one exact spot of a brain, an insuperable difficulty. We cannot get around such a difficulty by imagining that a brain uses the type of things that a book or a computer use to allow instant retrieval. Books and computers use information addressing and indexes to allow instant access of a particular data item. The brain has neither addressing nor indexes. Unlike houses that have street addresses, neurons don't have neuron numbers or any other addressing system. Storing a memory in a brain would be like throwing a little 3" by 5" card into a giant swimming pool filled to the top with a million little 3" by 5" cards. Just as it should take you ages to find a specific piece of information stored in such a swimming pool, it would take you ages to find in the brain some particular piece of learned information, if it was stored in one tiny spot, like a book stored in one spot on the shelves of a huge library.



(4) **The reading and decoding problem.** If a memory was stored in one particular spot, there would be the problem of how a memory could be read from that exact tiny spot. The brain seems to have nothing like a read mechanism. Nor is there any known mechanism by which information that had been stored as neural states or synapse states could be translated into a thought that would appear in your mind.

But there is another form of the idea that brains store memories. There is the idea that the brain stores a memory *throughout* the brain, rather than writing the memory only in one little spot. However, the difficulties in this idea are even worse than in the idea that the brain stores each memory in one specific spot. The idea that a memory is stored throughout the brain has the following difficulties:

(1) **A greatly worsened writing and encoding problem**. The idea that a memory is stored throughout the brain has the same writing and encoding problems mentioned above, except that now the problem is much worse. This is because now rather than just imagining that a memory is written in one tiny spot by a brain without any known writing mechanism, we must now imagine that such a brain manages to write all over itself each time that a memory is stored. This would take much more time than writing to a single spot in the brain. Humans routinely show the ability to instantly form new memories, an ability that neuroscientists cannot credibly explain. You only make that problem worse if you imagine that each time a memory is formed, the brain is writing to many different places rather than one.

(2) **A memory disassembly problem**. The idea that a memory is stored throughout the brain creates a gigantic new problem that did not exist if you assume a memory is written to only one tiny spot: a memory disassembly problem. If you imagine that a memory is broken up into tiny pieces and stored throughout the brain, then you have the problem that such a disassembly process would require additional time, making it all the more impossible to explain the wonder of instant memory formation. Similarly, it only takes a second for me to store a piece of paper by opening a book in my library and sticking the page inside the book; but if I have to cut up the page into twenty pieces and store the pieces in twenty books, that takes much longer.

(3) **A memory reassembly problem**. The idea that a memory is stored throughout the brain creates a gigantic new problem related to memory recall: a problem of reassembling the memory that had been stored in scattered pieces throughout the brain. If we imagine a brain with only one memory, such a thing does not seem so hard (the brain could just read throughout itself looking

for memory pieces, and read them all up). But if we imagine many, many thousands of memories that had each been stored by storing pieces of individual memories throughout the brain, then such an assembly seems impossible to occur, no matter how long it would take.

I can give an analogy. Suppose I am storing 1000 family photos through a scattered storage method. I take each of the thousand photos, cut them up into little pieces, and store each by putting them in different pages in the books that make up my large library. Now, suppose my wife comes and asks, "Please get me a picture of our trip to Los Angeles." Retrieving that photo would be a nightmare. I couldn't just get all the photo pieces by shaking each book in my library. That's because the pieces of each photo would be mixed up with all the pieces of 1000 other photos. Similarly, we can imagine no way in which a brain that has scattered pieces of each memory throughout itself could ever reassemble such pieces to produce a good recall of a particular memory. And if it ever could do such a thing, such a recall would take very long lengths of time, and a recollection could never occur instantly.

(4) A greatly worsened reading and decoding problem. The idea that a memory is stored throughout the brain has the same reading and decoding problems mentioned above, except that now the problem is much worse. This is because now rather than just imagining that a memory is read from one tiny spot by a brain without any known writing mechanism, we must now imagine that such a brain manages to read from all over itself each time that a memory is retrieved. This would take much more time that reading from a single spot in the brain. Humans routinely show the ability to instantly retrieve new memories, an ability that neuroscientists cannot credibly explain. You only make that problem worse if you imagine that each time a memory is recalled, the brain is reading from many different places rather than one.

There was recently in the news an MIT press release story making the utterly unfounded claim that some research had shown that "a single memory is stored across many connected brain regions." What we have is another misleading claim about engrams from MIT, which for many years has been a notorious source of unfounded claims about neural memory storage. In the 2018 post here I took a long look at how MIT memory researchers had repeatedly made grandiose but unfounded claims about memory research. I showed that MIT researchers had again and again made grandiose claims based on shoddy poorly-designed rodent studies guilty of using way too small sample sizes. The results proclaimed by such researchers are mainly false alarms, the type of false alarms that are very easy for a researcher to get when he uses fewer than 20 subjects per study group.

The latest memory research announcement by MIT discusses research guilty of the same old shoddy research practices that MIT memory researchers have been guilty of for so many years. Once again, when we read the scientific paper (which can be read here) we find that the researchers used way-too-small study group sizes, such as one group of only 7 mice, another group of another 9 mice, and another group of only 10 mice. If the scientists had acted like good experimental scientists and had done what is called a sample size calculation, they would have found out that such tiny study group sizes are utterly inadequate to produce a reliable result. But they did no such calculation. They confess in their paper, "No statistical methods were used to predetermine sample sizes."

The scientists fear-conditioned mice by electrically shocking them (this typically involves getting mice to learn there is one little area of a cage where the shocking will occur). The scientists then measured something in lots of different regions in the brain of a very small number of mice, and the scientists have somehow got the idea that some regions were involved in memory storage. To test such suspicions they "optogenetically stimulated" mice to try to artificially create fear in the mice, zapping the little regions they thought were involved in storing a memory. This "optogenetic stimulation" is a method of using light to zap the brain of a mouse.

The thinking behind such strange zappings of mouse brains is that by zapping some little part of a mouse's brain, you can get a mouse to remember some fear memory formed when a mouse was zapped by stepping on an electrical plate. The underlying theoretical assumption was wildly implausible. It was the idea that if a mouse has a particular memory stored in many brain regions, then you can get the mouse to re-experience that memory by stimulating *only one* of those regions. Such an idea makes no sense. It's kind of like thinking that I would get Tom Brady to throw a pass by sticking a sewing needle in his arm, stimulating one of the many muscles he uses in throwing a pass.

Conclusions about whether the fear memory was recalled were based on a poor low-reliability technique that neuroscientists have long used: a judgment about whether so-called "freezing behavior" occurred (such behavior being defined as mere inactivity). The underlying assumption is that mice freeze when afraid, and that you can judge if a mouse is recalling a fear memory by looking for an instant of non-movement in which a mouse may be "freezing in fear." Given the start-stop, helter-skelter way in which mice move, any judgment about whether a mouse froze is going to be a subjective, unreliable judgment. So there is too much of a possibility of observational bias here, one in which an observer subjectively reports the effect he is hoping to find. Similarly, you might subjectively report that your goldfish in a goldfish bowl tends to move towards you when you are looking into the bowl, but that would probably tell us more about your desire to see something than about the goldfish. The idea that mice freeze when terrified isn't even a very sound one. I have seen dozens of mice *flee* when scared by a human, but I never once seen a mouse *freeze* when suddenly scared by the presence of a human.

There is a very reliable way to measure fear in mice: you measure the mouse's heart rate, which undergoes a very sharp spike in mice when they are afraid. Our neuoroscientists senselessly continue to use unreliable subjective judgments about "freezing behavior" to try to measure fear in rodents, rather than sensibly using reliable measurements of heart rate spikes in rodents. Being guilty of this flaw, the new MIT study has provided no reliable evidence about whether or not the mice remembered fear when parts of their brains were zapped.

Moreover, when "freezing" (simple non-movement) occurred in the mice, the "freezing effect" could have been produced not by a recall of fearful memories, but by the very fact the energy was being transmitted into the brain of the mice. Imagine you are running along, and suddenly a scientist switches on some weird thing that causes some energy to pour into your brain. This all by itself might cause you to stop, even if it didn't cause you to recall some memory that caused you to stop. What could have been going on in the mice was just a kind of pausing effect caused by a novel stimulus rather than a recalled fear effect. A science paper says that it is possible to induce freezing in rodents by stimulating a wide variety of regions. It says, "It is possible to induce freezing by activating a variety of brain areas and projections, including the hippocampus (Liu et al., 2012), lateral, basal and central amygdala (Ciocchi et al., 2010); Johansen et al., 2010; Gore et al., 2015a), periaqueductal gray (Tovote et al., 2016), motor and primary sensory cortices (Kass et al., 2013), prefrontal projections (Rajasethupathy et al., 2015) and retrosplenial cortex (Cowansage et al., 2014)."

Neither the paper nor its supplementary information contains any mention of a blinding protocol, other than the bare statement that "all behavior experiments were collected and analyzed blind to experimental group." Unless a paper has a detailed discussion of how an *effective* blinding protocol was implemented (one that really achieves a blinding effect to prevent observer bias), we should assume that no effective blinding protocol was implemented. For example, if you had one group of 7 mice with optogenetic wires attached to their brains, and another group of control mice with no such wires, anyone would be able to tell which group was the group that was hoped would show more "freezing" behavior (even if those judging how much the mice froze were not specifically told which group was which). So some method that can technically be referred to as "blind" may not be blind at all because of a lack of an effective protocol. Whenever any paper claims a blinding protocol but fails to specify how an effective protocol was achieved, we should assume that no effective methods of blinding were used (a severe defect in an experiment).

Being guilty of quite a few serious methodological flaws (primarily the use of way-too-small study group sizes), the new MIT study has produced no robust evidence that memories are stored in the brains of mice, and no robust evidence that a memory is stored in many different regions of the brains rather than in some particular spot. According to the paper here, "Quality research practice requires both testing statistical significance and reporting effect size." But the new MIT paper reports no effect size. That is what goes on when shoddy experimental research practices have been followed, such as using way-too-small study group sizes.

In this paper here we have a discussion of the absurd technique most commonly used to measure fear in rodents:

"In mice, freezing is a common and easily measured response used as an index of fear conditioning (Blanchard and Blanchard 1988; Graef 1994). Fanselow (1990) and Paylor et al. (1994) define freezing as the absence of any movement except for respiratory-related movements. Freezing behavior is measured by direct observation, scoring an animal as either freezing or active per interval of time, usually every 5–10 sec (Fanselow 1990; Paylor et al. 1994) or measuring freezing duration with a stopwatch (Phillips and Le Doux 1992)."

The technique discussed above measures only mouse inactivity, which will vary randomly. There is no sound basis for calling such a measurement a measurement of "freezing behavior." If I take 10 snapshots of a mouse per minute, that show the mouse not moving in three of those snapshots, that is no reason for thinking that the mouse was afraid when three of those ten snapshots were taken. What is occurring these days among cognitive neuroscientists is deceptive labeling of mouse inactivity measurement. Graphs that should be labeled "mouse inactivity (%)" are being misleadingly labeled "mouse freezing (%)." The term "freezing" should never be used unless a sudden stopping of traversal was observed.

at April 18, 2022 No comments:

Labels: memory storage

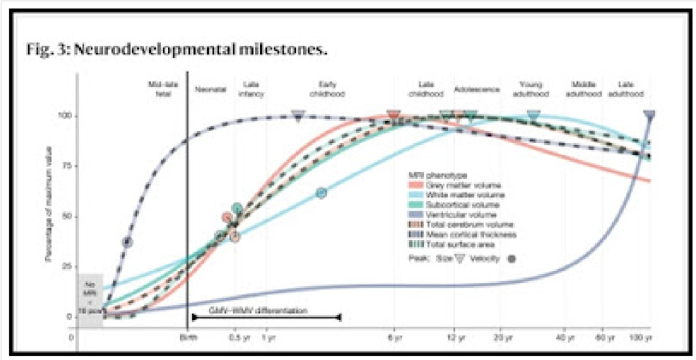
Monday, April 11, 2022

Big Study Finds Brain Gray Matter and Cortical Thickness Peak at Age 6 or Earlier, Contradicting Brain Dogmas

A new study published in Nature (with very many listed authors) has produced a result very relevant to claims that the human mind is produced by the brain. Entitled "Brain Charts for the Human Lifespan," the paper says, "We aggregated 123,984 MRI scans, across more than 100 primary studies, from 101,457 human participants between 115 days post-conception to 100 years of age." MRI scans are a type of scan that allow you to see the physical structure of the brain.

Human experience is that intelligence roughly peaks around age 20, with no major decline before age 40. The lack of intellectual decline before age 40 is partially why nations generally elect leaders that are 40 years old or older, and it is partially why major corporations generally have as their Chief Executive Officer someone who is age 40 or older. The claim has often been made that gray matter in the brain is some type of neural matter particularly associated with intelligence. It has often been claimed that you think with the gray matter of your brain. Given human intelligence peaking around age 20, and not declining much before age 40, such claims predict that gray matter in the brain should peak at around age 20, without much decline before age 40.

But this is not at all what the "Brain Charts for the Human Lifespan" study found. It found that gray matter in the brain peaks at around age 6, with about a 12% decline by age 20, and about a 20% decline by age 40. This is shown in a chart from the paper:

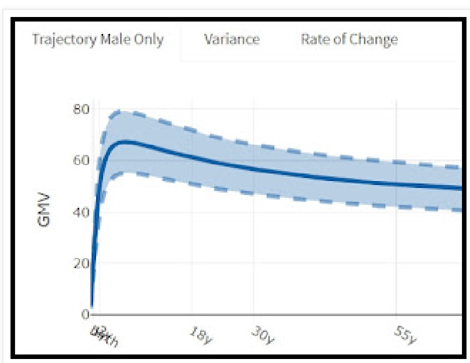


From the "Brain Charts for the Human Lifespan" [*paper*]

According to this chart:

- Gray matter volume peaks around age 6;
- gray matter volume declines by about 12% by age 20;
- gray matter volume declines by about 20% by age 40;
- cortical thickness peaks by about age 2 or 3;
- cortical thickness declines by about 10% by age 20;
- cortical thickness declines by about 15% by age 40;
- white matter volume peaks at about age 30.

The chart above is a bit hard to read, but at a web site set up by the paper authors, the gray matter volume trend by age is graphed in the easy-to-read graph below:



Source: https://brainchart.shinyapps.io/brainchart/

The data presented in the new study simply does not match human experience regarding intelligence and age. I cannot cite any numbers showing a growth of IQ by age, because IQ tests are designed to test differences in either children of one age or adults. But the following are simple facts of human experience

- Children age 6 have an intelligence that only seems to be 50% or smaller than the intelligence of adults (despite the gray matter volume peaking around age 6);
- adults of age 40 do not have an intelligence noticeably less than those of adults at age 20, and have an intelligence much greater than those age 6 or younger (despite such 40-year-olds having 20% less gray matter volume than those age 6, about 15% less

cortical thickness than those age 2, and roughly 10% less gray matter volume than those age 20);
- adults of age 20 have an intelligence much higher than children of age 6 (despite such 20-year-olds having about 12% less gray matter volume than those age 6, and about 10% less cortical thickness than those age 2 or 3);
- adults of age 30 do not seem any smarter than adults age 20 (despite such 30-year-olds having white matter volume peaking at their age);
- children with an age of about 2 or 3 have an intelligence that only seems to be a small fraction of the intelligence of adults (despite their cortical thickness peaking around this age).

Once again, the "brains make minds" dogma gigantically flunks an empirical test. But you won't hear about this failure in the mainstream media, which tends to keep scientists and the public in a "filter bubble" that allows them to keep thinking that their cherished dogmas are holding up well, no matter how miserably such dogmas are failing empirical tests. So, for example, a Nature article on the "Brain Charts for the Human Lifespan" study completely fails to mention how dramatically the study's data conflicts with human experience about how intelligence changes with age.

at April 11, 2022 No comments:

Labels: brain changes with age

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Head Truth

The huge case for thinking minds do not come from brains

Monday, April 4, 2022

"Brains Make Minds" Idea Flunks an Audit of a Large Brain Scan Database

For many years neuroscientists have been claiming important results about brains and minds, after doing brain imaging experiments using small sample sizes. Typically such claims will be based on way-too-small sample sizes smaller than 15. A new press release from the University of Minnesota Twin Cities announces results which indicate that such small-sample correlation-seeking imaging experiments are utterly unreliable. The headline of the press release is "Brain studies show thousands of participants are needed for accurate results."

There is a technique to measure the reliability of brain scans when used to make claims about supposed neural signs of cognitive activity. The technique involves measuring what is called the test-retest reliability of brain scans. The technique involves trying to determine to what extent some claimed neural sign of cognitive activity shows up both times when two different brain scans are taken of the same person.

So, to imagine a hypothetical example, suppose some claim is made that the hippocampus of some subject activated more strongly when the subject recalled something. A check can be made as to whether the same thing was seen when the same subject had his brain scanned a second time, doing the same recall task. If no such increased activation is seen on the second brain scan, we have a good reason for thinking that the claim about the first scan is unwarranted, and that the first scan has simply given a false alarm, a result of random brain fluctuations.

Conveniently "covering their tracks," the vast majority of neuroscientists fail to do a retest of subjects when doing brain scanning experiments. However, there are some large databases of brain scans that include scanning retests of many subjects. It is therefore possible to judge how well claimed neural correlations of cognitive activity tend to replicate when a second test is done of the same subject.

One such brain imaging database is the Adolescent Brain Cognitive Development Database. The database includes scans of thousands of subjects doing particular tasks such as a Monetary Incentive Delay task. a Stop Signal task and an n-back or nBack task (as described here). The database includes brain scans of more than 10,000 adolescents, and for more than 7000 of these adolescents a second set of scans were taken two years later, with the subjects performing the same tasks as in the first scan. Such a database provides an excellent platform to test whether correlations between brain states and mental activity tend to repeat when the same subjects were scanned two years later.

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Such an examination is reported in the scientific paper entitled "Reliability and stability challenges in ABCD task fMRI data" by James T. Kennedy and others, which you can read here or here. The study used a measure of retest reliability called the intraclass correlation. An intraclass correlation of less than .4 is generally regarded as "poor." In the wikipedia.org article on the intraclass correlation we read the following:

"Cicchetti (1994) gives the following often quoted guidelines for interpretation for kappa or ICC inter-rater agreement measures:

- *Less than 0.40—poor.*
- *Between 0.40 and 0.59—fair.*
- *Between 0.60 and 0.74—good.*
- *Between 0.75 and 1.00—excellent.*

A different guideline is given by Koo and Li (2016):

- *below 0.50: poor*
- *between 0.50 and 0.75: moderate*
- *between 0.75 and 0.90: good*
- *above 0.90: excellent"*

The results reported in the scientific paper entitled "Reliability and stability challenges in ABCD task fMRI data" by James T. Kennedy and others were devastatingly negative. In the paper's abstract we read this:

"Reliability and stability [quantified via an intraclass correlation (ICC) that focuses on rank consistency] was poor in virtually all brain regions, with an average ICC of .078 and .054 for short (within-session) and long-term (between-session) ICCs, respectively, in regions of interest (ROIs) historically-recruited by the tasks. ICC values in ROIs did not exceed the 'poor' cut-off of .4, and in fact rarely exceeded .2 (only 5.9%).... Poor reliability and stability of task-fMRI, particularly in children, diminishes potential utility of fMRI data due to a drastic reduction of effect sizes and, consequently, statistical power for the detection of brain-behavior associations."

What this means is that there was extremely low level of repetition of effects between one scan on a subject and a later scan on the same subject. As mentioned above, an intraclass correlation of less than .4 or .5 is commonly described as "poor." The very low intraclass correlations reported (only .078 and .054) can be described as *extremely* poor or *appallingly* poor. In the quote below, the authors of the study describe their results as a "particularly disappointing outcome," and wonder what factors contributed to so poor an outcome. We read the following:

*"Our main finding was that within-session reliability and longitudinal stability of individual differences in task-related brain activation was consistently poor for all three ABCD tasks. Data cleaning approaches like outlier removal, movement regression, and rank normalization significantly increased reliability and stability, but by a small, seemingly inconsequential amount (average change of less than .025). While the finding of poor within-session reliability and longitudinal stability in the ABCD task fMRI data did not come as a surprise, given the mounting evidence for generally lackluster reliability of task-fMRI in mostly adult samples (**Elliott et al., 2020**; **Herting et al., 2018**; **Noble et al, 2021**), the present estimates are far below the .397 average reliability of task-fMRI activation estimated in the meta-analysis*

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- In Neuroscience Papers Bluffing Is More Common Than Candor
- Young Age of Languages Contradicts Claims of Neural Storage of Linguistic Information
- Vacillating Disarray of the Memory Trace Theorists
- Study Finds "Poor Overall Reliability" of Brain Scanning Studies
- "Brains Store Memories" Dogma Versus the Reality of Noisy Brains
- The Brain Has Nothing Like 7 Things a Computer Uses to Store and Retrieve Information

*by **Elliott et al. (2020)**. The question then arises, what factors could contribute to this* **particularly disappointing outcome? "**

These results are what we would expect under the idea that the brain is not the source or cause of human mental activity, and not the storage place of memories. In such a case we would expect that when scientists claimed some correlation between brain activity and mental activity after brain scanning some subjects, they would almost always be finding mere false alarms that would strongly tend to disappear when a second brain scan was made of the same subjects.

at April 04, 2022   5 comments:

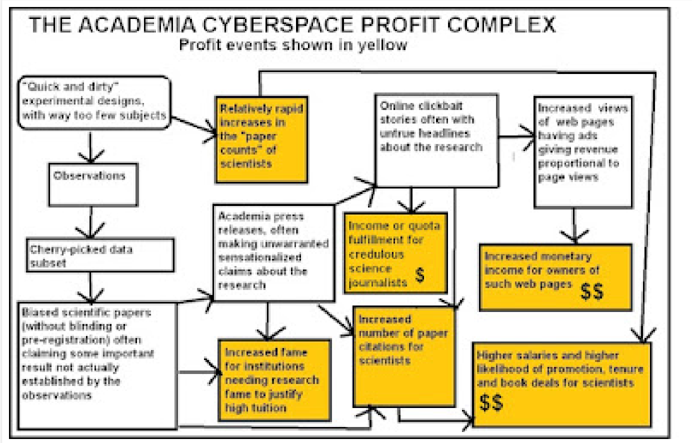
Labels: brain imaging

Tuesday, March 29, 2022

Why the Academia Cyberspace Profit Complex Keeps Giving Misleading Brain Research Reports

Why do so many untrue and misleading stories about brains and minds appear in the press? The answer is largely a financial one: because various parties profit from such misleading stories. Using the famous "follow the money" slogan in the main movie about the Watergate affair (*All the President's Men*), let us "follow the money" and see how various parties profit from misleading stories about brains and minds in the press.

The interesting diagram below illustrates a profit complex that links academia and cyberspace (a word that means the same as the Internet).



To understand this profit complex, you must first understand how modern scientists are judged by their peers and superiors in academia. There are two numbers by which scientists are judged: (1) the number of scientific articles that the scientist has written or co-written, called the paper count; (2) the number of other papers that have mentioned or cited one of the papers the scientist has written or co-written, called the citation count. If you are a scientist hoping for a promotion such as tenure or a higher salary, you very much want these numbers to be as high as possible.

The desire to raise such numbers (for the benefit of a scientist) is very much a factor when a scientist designs an experiment. Given the choice between some "quick and dirty" experimental design that will be likely to produce some result that is either a quick and easy result or a positive result or a result that can be claimed as some important result, and some other design that involves some more stringent research method that is longer, harder, or less likely to result in a positive result or a result that can be claimed as important, a scientist who is very interested in increasing his paper count and his citation count will be more likely to choose the "quick and dirty" design. Such "quick and dirty" designs will very often involve way-too-small sample sizes, in which fewer than 15 subjects are studied (often for studies in which many dozens, hundreds or thousands of subjects would be needed if you wanted to get a reliable result). A scientific study found that research papers that failed to replicate were on average 153 times more likely to be cited than papers describing research that replicated, stating this: "papers that replicate are cited 153 times less, on average, than papers that do not." Such failing-to-replicate studies typically involve shoddy "quick and dirty" experimental designs.

Nowadays science journals have a tendency called "publication bias," which is a tendency to publish papers reporting positive results and reject papers reporting null or negative results. When a scientist does an experiment that produces a null or negative result, and is not able to get a journal to publish the paper, the scientist's paper count is not increased, and the effort does nothing to advance the scientist's career. So scientists will avoid very careful and stringent designs less likely to result in a paper reporting a positive result, and will be more likely to create "quick and dirty" designs more likely to result in a positive result and more likely to result in a positive result that can be produced more quickly. The quicker the experiment can be done, the more quickly can the scientist's paper count be increased.

After creating this design, some observations are produced. Desiring to report some positive result and ideally some important-sounding result, scientists will tend to filter or segregate the observations to produce some subset that is more favorable to the reporting of a positive and interesting-sounding result. Sometimes this process can be described as cherry-picking, and other times this process is something rather along the lines of "keep slicing and dicing the data until it gives what is wanted" or "keep torturing the data until it confesses." There are 101 reasons that can be given for excluding some data points and keeping other data points. There are also hundreds of statistical methods that can be used to massage and filter data until you are left with more favorable results. In this analysis of data, scientists will have a motivation not to use blind analysis techniques that minimize the chance of biased analysis in which scientists report seeing what they want to see.

After such analysis is completed, there comes the writing of a scientific paper. When writing up a scientific paper, scientists are very motivated to describe the research as showing some positive result, even if the research has mainly or entirely produced a negative or null result. This is because scientists want to increase their paper count (the number of published papers they have authored or co-authored); and given publication bias in which journals tend to reject papers reporting only negative results, a paper reporting a negative result may be unlikely to be published. Scientists will also be very motivated to report getting some important result. The more that a scientist tends to claim that some important result was produced by the research, the more likely will be the publication of the paper. Also, the more important the result that is claimed, the more likely the paper will be to be cited by other papers. Such citations are extremely important to scientists, as scientists are judged not just by their paper count (the number of papers they have written), but also by their citation count (the number of times such papers have been cited).

It very often happens that in writing up papers describing their research, scientists make claims that are misleading, exaggerated or just plain false. At a blog entitled "Survival Blog for Scientists" and subtitled "How to Become a Leading Scientist," a blog that tells us "contributors are scientists in various stages of their career," we have an explanation of why so many science papers have inaccurate titles:

"Scientists need citations for their papers....If the content of your paper is a dull, solid investigation and your title announces this heavy reading, it is clear you will not reach your citation target, as your department head will tell you in your evaluation interview. So to survive – and to impress editors and reviewers of high-impact journals, you will have to hype up your title. And embellish your abstract. And perhaps deliberately confuse the reader about the content."

Is this how scientists are trained?

A neuroscientist makes this confession:

"This system comes with big problems. Chief among them is the issue of publication bias: reviewers and editors are more likely to give a scientific paper a good write-up and publish it in their journal if it reports positive or exciting results. So scientists go to great lengths to hype up their studies, lean on their analyses so they produce 'better' results, and sometimes even commit fraud in order to impress those all-important gatekeepers."

After a scientific paper has been written up and published, it is announced with a press release issued by the main academic institution involved in the research. Nowadays the press releases of universities and colleges are notorious for making sensationalized claims that are not warranted by anything discovered in the research being discovered. Often a tentative claim made in a scientific paper (basically a "perhaps" or a "maybe") will be stated as if it is was simply a discovery of a definite fact. Other times a university press release will make some important-sounding claim that was never made in the scientific paper writing up the research. An example was that when there appeared a scientific paper merely claiming that "Regional synapse gain and loss accompany memory formation in larval zebrafish," there appeared a great number of press stories repeating the headline of a press release claiming that the formation of a memory had been observed (a claim not made in the paper). We have every reason to believe that synapse gains and losses occur continually in the human body, regardless of whether some new memory is forming.

Authorship anonymity is a large factor that facilitates the appearance of misleading university and college press releases. Nowadays university and college press releases typically appear without any person listed as the author. So when a lie occurs (as it very often does), you can never point the figure and identify one particular person who was lying. When PR men at universities are thinking to themselves "no one will blame me specifically if the press release has an error," they will feel more free to say misleading and untrue things that make unimpressive research sound important. We should always hold every single scientist involved in a scientific paper responsible and accountable for every untruth that appears in a scientific paper they co-authored and also ever untruth that appears in the university press release announcing the paper, unless that scientist has publicly protested the misstatement.

Misleading press releases produce an indirect financial benefit for the colleges and universities that release them. When there occurs untrue announcements of important research results, such press releases make the college and university sound like some place where important research is being done. The more such press releases appear, the more people will think that the college or university is worth the very high tuition fees it charges.

Judging from the quote below, it seems that science journalists often look down on the writers of university and college press releases, even though such science journalists very often uncritically parrot the claims of such people. In an Undark.org article we read this:

"Still, there are young science journalists who say they would rather be poor than write a press release. Kristin Hugo, for example, a 26-year-old graduate of Boston University's science journalism program, refuses to step into a communications role with an institution, nonprofit or government agency. 'I've been lucky enough that I haven't had to compromise my integrity. I really believe in being non-biased and non-partisan,' she says. 'I really, really, really want to continue that. I wouldn't necessarily begrudge someone for going into [public relations] because there's money in that, but I'd really like to stay out of it.' "

Misleading press releases also help to sustain cyberspace profit systems outside of a college or university. Such press releases are repeated (often with further exaggerations and misstatements) by a host of web sites offering clickbait headlines leading to web pages containing ads. The more people click on these clickbait headlines, the more page views there are for pages containing ads. The more people view those pages, the more advertising revenue the web sites get.

So web sites giving science news stories have a very large financial incentive to produce exaggerated or untrue headlines that users will be more likely to click on. If the headline on a web page truthfully says, "Another Junk Science Brain-Scanning Result," almost no one will click on the headline to go to the page with the story containing ads. But if the headline untruthfully says, "Breakthrough Study Reveals the Secret of Memory," then thousands of people may click on the headline, producing many pages views of the story the link leads to, and much more advertising revenue.

The web sites are one profit center benefiting from poor and misleading science journalism that exaggerates or misrepresents unimpressive research. Another profit center is the science journalists themselves. Most science journalist do not work on some salary basis in which they are paid the same annual salary regardless of what they write. Instead most science journalists work on a per-article basis, earning about $1 per word for an article in a print magazine such as Discover Magazine, or about $300 per article for an online article. Such journalists tend to pitch their stories to editors. The more sensational sounding the story, and the more exciting the claims made, the more likely the story will be to get published. An article that applies critical scrutiny to some impressive-sounding press release claim will be unlikely to be published. By uncritically parroting unfounded but exciting-sounding claims in university and college press releases, science journalists help to fatten their own wallets. Often science journalists will imaginatively add their own unwarranted claims and unjustified spin about some research, hoping to further

Were True

- "Brains Make Minds" Models All Flunk a Large Brain Scan Study
- The Philosophy of Teleospiritism
- The Biggest Blunders of Theories Such as Integrated Information Theory
- Study Finds No Robust Link Between Brain Structure and Personality
- The Two Huge Mistakes Involved in Typical Talk of a "Hard Problem of Consciousness"
- Neuroscientists Keep Wrongly Assuming the Source of Something Must Be Near Its Observed Manifestations
- The Vague Unfounded Boasts of Biology Sound Like the Vague Unfounded Boasts of Astrophysics
- 8 Reasons for Doubting Claims of the Heritability of Intelligence
- Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"
- Exhibit A Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- Exhibit B Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
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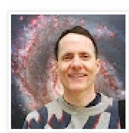

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March 2023 (2)

increase their chances of receiving fees for writing exciting-sounding news stories. In general, science journalists getting paid by word or by article are often very unreliable sources of information.

To "follow the money" all the way, we must go back to the scientists who originally chose "quick and dirty" designs, and who may have misstated the implications and findings coming from their research. What is the result when "quick and dirty" experiment designs are chosen? The result is that the paper count (the number of published papers) of a scientist will increase more quickly. What is the result when scientists misstate or exaggerate what their observations show or imply, making their research sound important when it is not? The result is a greater number of citations of their papers by other scientists. The very important "citation count" of a scientist will increase. What is the financial result when a scientist has piled up a high paper count and a high citation count? That scientist will be more likely to get promoted, more likely to get the tenure that gives him a lifetime job, more likely to get a higher salary, more likely to get a lucrative book deal with a major publisher, and so forth.

What we have is an infrastructure that all over the place incentivizes bad agents who mislead and misinform, as long as such persons mislead and misinform in some way that produces exciting-sounding results that fit in with popular academia belief systems. Given such an infrastructure, you should not be surprised to hear that today's cognitive neuroscience is a house of cards that mostly rests on an illusory foundation. Most of the things that neuroscientists claim have been established by cognitive neuroscientists have not actually been established by them at all. Most of the more important-sounding claims made in the neuroscience news stories of recent years are claims lacking any solid foundation in observations. Junk science flourishes, because there are so many people in so many different places who profit from junk science.

at March 29, 2022 No comments:

Labels: academia dysfunction, science journalism, scientist misconduct, sociology of science

Sunday, March 20, 2022

"Thousands of Participants Are Needed for Accurate Results," But Most Brain Scan Studies Don't Even Use Dozens

For many years neuroscientists have been claiming important results about brains and minds, after doing brain imaging experiments using very small sample sizes. For example, we may read headlines saying that some particular region of the brain is more active during some type of mental event, and the total number of subjects who had their brains scanned will usually be smaller than 15. A new press release from the University of Minnesota Twin Cities announces results which indicate that such small-sample correlation-seeking brain imaging experiments are utterly unreliable. The headline of the press release is "Brain studies show thousands of participants are needed for accurate results."

We read this:

"Scientists rely on brain-wide association studies to measure brain structure and function—using MRI brain scans—and link them to complex characteristics such as personality, behavior, cognition, neurological conditions and mental illness. New research published March 16, 2022

in Nature from the University of Minnesota and Washington University School of Medicine in St. Louis...shows that most published brain-wide association studies are performed with too few participants to yield reliable findings."

The abstract of the paper in the science journal Nature can be read here. The paper is entitled, "Reproducible brain-wide association studies require thousands of individuals."

The press release tells us this:

"The study used publicly available data sets—involving a total of nearly 50,000 participants—to analyze a range of sample sizes and found:

- *Brain-wide association studies need thousands of individuals to achieve higher reproducibility. Typical brain-wide association studies enroll just a few dozen people.*
- *So-called 'underpowered' studies are susceptible to uncovering strong but misleading associations by chance while missing real but weaker associations.*
- *Routinely underpowered brain-wide association studies result in a surplus of strong yet irreproducible findings."*

The claim that a typical brain scanning experimental study uses "a few dozen" people is probably an overestimate. Brain imaging studies touted in the press seem to typically involve fewer than 15 subjects.

The press release tells us that the conclusions above are based on some very heavy number crunching using databases that store brain scans of a large number of people, including in many cases data on what they were doing or thinking while being scanned, what kind of mental characteristics or health history the people had, and what kind of genes the people had. The largest such database was the UK Biobank, which according to page 5 of the document here includes "resting-state functional MRI measures changes in blood oxygenation associated with intrinsic brain activity (i.e., in the absence of an explicit task or sensory stimulus)," as well as "task-functional MRI" which "uses the same measurement technique as resting-state fMRI, while the subject performs a particular task or experiences a sensory stimulus." (The task was mainly something called the Hariri faces/shapes "emotion" task.) Another large database used was a Human Connectome Project database including "task-evoked fMRI" brain scans of people while they were doing things involving working memory, gambling, language, social cognition, relational processing and emotional processing (as mentioned on page 36 of the document here). Another large database used was an Adolescent Brain Cognitive Development (ABCD) database that included fMRI scans while subjects performed tasks such as a Monetary Incentive Delay task. a Stop Signal task and an "n-back" or "nBack" task (as described here).

In the press release we read this:

"To identify problems with brain-wide association studies, the research team began by accessing the three largest neuroimaging data sets: the Adolescent Brain Cognitive Development Study (11,874 participants), the Human Connectome Project (1,200 participants) and the UK Biobank (35,375

September 2018 (1)
August 2018 (1)
July 2018 (1)
June 2018 (1)
April 2018 (30)

Labels

- "brain as computer" metaphor
- academia dysfunction
- adult neurogenesis
- AI
- binary memory storage theory
- brain changes with age
- brain connectivity
- brain effect on personality
- brain imaging
- brain injury
- brain research projects
- brain shortfalls
- brain signal speed
- brain surgery
- brain uploading
- brain waves
- claims of mind reading by brain scans
- claims of neural correlates of mental activity
- COVID-19
- decisions
- default mode network
- dendritic spines
- depression
- distributed recall hypothesis
- DNA
- EEG studies
- emergence
- epilepsy
- ESP
- evolution
- exceptional memory
- exceptional speed of thinking
- file drawer effect
- fraud
- free will
- genes
- global workspace theory
- groupthink
- health hazards in neuroscience experiments
- hemispherectomy
- high mental function despite large brain damage

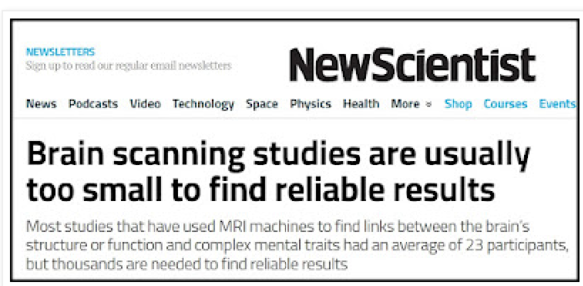
participants). Then, they analyzed the data sets for correlations between brain features and a range of demographic, cognitive, mental health and behavioral measures, using subsets of various sizes. Using separate subsets, they attempted to replicate any identified correlations. In total, they ran billions of analyses, supported by the MIDB Informatics Group and the powerful computing resources of the Minnesota Supercomputing Institute. The researchers found that brain-behavior correlations identified using a sample size of 25—the median sample size in published papers—usually failed to replicate in a separate sample. As the sample size grew into the thousands, correlations became more likely to be reproduced. Robust reproducibility is critical for today's clinical research. Senior author Nico Dosenbach, MD, PhD, an associate professor of neurology at Washington University, says the findings reflect a systemic, structural problem with studies that are designed to find correlations between two complex things, such as the brain and behavior."

What this study very strongly indicates is that the vast majority of brain imaging studies trying to correlate brains and mental states or mental activity have misled us by producing false alarms. The study indicates that such brain imaging studies have not merely been guilty of some slight shortfall, but have been guilty of a *hundred-fold* shortfall (the difference between about 20 and "thousands" being a difference of a hundred times). It's as bad as if someone told you he produced a score of 1000 on his SAT test, but really only produced a score of 10.

The study described above was led by neuroscientist Scott Marek. An article on the study in the journal Nature says this:

" 'There's a lot of investigators who have committed their careers to doing the kind of science that this paper says is basically junk,' says Russell Poldrack, a cognitive neuroscientist at Stanford University in California, who was one of the paper's peer reviewers. 'It really forces a rethink.' "

The New Scientist article on the Marek study is behind a paywall, but at least I can show its headline:



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Brain scanning studies are usually too small to find reliable results

Most studies that have used MRI machines to find links between the brain's structure or function and complex mental traits had an average of 23 participants, but thousands are needed to find reliable results

For many years we have been scammed and the US federal government has been scammed by neuroscientists doing ridiculously low-powered brain imaging studies looking for correlations between brains and minds. For many years our experimental neuroscientists doing small-sample brain imaging studies (looking for correlations between brain states and mental states) have been playing a game of "sham, scam, thank you Sam," the Sam being Uncle Sam who provided the dollars for such worthless studies producing only false alarms. This is a racket, but since it is a nice little source of dishonest income and easy work for professors, the racket will probably long continue.

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

The US government seems to be incredibly poor at recognizing bad performance by biology authorities. In the New York Times there was recently an opinion article with the headline "How Millions of Lives Might Have Been Saved from COVID-19." Without naming any names of the bumbling officials guilty of the bungled US response to COVID-19, we get some startling comparisons between competent responses in small countries and incompetent responses in the US. For example, we are told that Taiwan has suffered only 853 COVID-19 deaths, and that "if the United States had suffered a similar death rate, we would have lost about 12,000 people, instead of nearly a million." Because the US government seems to be extremely poor at recognizing bad performance by biology authorities. we will probably continue to see the "sham, scam, thank you Sam" researchers bilking the government by doing worthless federally-funded small-sample brain imaging studies producing only false alarms.

One of the quotes above tells us that correlations reported with a sample size of 25 "usually failed to replicate in a separate sample," but that "as the sample size grew into the thousands, correlations became more likely to be reproduced." Does this mean that strong correlations were found between brains and cognitive activity or cognitive states as long as you used samples of thousands? No. The Nature article on the Marek study tells us this:

"Researchers measure correlation strength using a metric called r, for which a value of 1 means a perfect correlation and 0 none at all. The strongest reliable correlations Marek and Dosenbach's team found had an r of 0.16, and the median was 0.01."

So even when data on thousands of subjects was used, no strong or medium correlations were found, and the median correlation was a negligible 0.01. A medium-strength correlation has an r of about .5, and a strong correlation has an r of about .7. The results discussed above are consistent with the idea that the brain is not the source of the human mind, and is not the storage place of human memories. Under such an idea, we would expect there to be no strong correlations between brain states and unemotional mental activity such as calm thinking or calm recall.

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

at March 20, 2022 No comments:

Labels: brain imaging, brain research projects, claims of neural correlates of mental activity, replication crisis

Monday, March 14, 2022

When They Get Data Suggesting Brains Don't Make Minds, They Repackage It As "Brains Make Minds"

The "brains make minds" dogma is so entrenched in academia that many scientists feel afraid to challenge it, on the grounds that becoming a heretic is not a good career move. What often happens is that scientists will get some observational result that is inconsistent with the dogma that brains make minds, and such scientists will try to repackage this result as a "brains make minds" result. Examples of this can be found in the discussion of humans who think very well and have good intelligence despite having lost half, most or almost all of their brains because of disease or surgery to stop severe seizures. Rather than listening to what nature is suggesting by such cases (that the brain is not the source of the mind), our scientists may try to repackage such results as something like "evidence of the amazing plasticity of the brain, which can work well even when most of it has been lost." Similarly, if someone claims your teeth produce your mind, and you lose most of your teeth, he may say, "Well, isn't that amazing: it requires just a few teeth for you to be smart!"

In today's science news, we have an example of such repackaging of results to fit the standard narrative (even when the results suggest that narrative is wrong). It is a news story entitled "Surprise! Complex Decision Making Found in Predatory Worms With Just 302 Neurons." No evidence has been produced that such decision-making occurs through neurons. We read, "Instead of looking at actual neurons and cell connections for signs of decision making, the team looked at the behavior of *P. pacificus* instead – specifically, how it chose to use its biting capabilities when confronted with different types of threat." We read about the worms taking "two different strategies" when biting, one involving "biting to devour" and the other involving "biting to deter." We read this:

"By observing where P. pacificus *worms laid their eggs, and how their behavior changed when a bacterial food source was nearby, the scientists determined that bites on adult* C. elegans *were intended to drive them away – in other words, they weren't simply failed attempts to kill these competitors. While we're used to such decision making from vertebrates, it hasn't previously been clear that worms had the brainpower to proverbially weigh up the pros, cons, and consequences of particular actions in this way."*

If we knew such worms produced such "complex decision making" by the action of neurons, would we then be entitled to say, "Complex decision making can arise from only 302 neurons"? No, not at all. Very many or most of the neurons of any organism are presumably dedicated to things such as muscle movement, sensory perception and autonomic function. We should presume that 90% of the neurons in such worms are tied up in such things. If you then wanted to claim that complex decision making came from the neurons of such worms, you would have to presume that a mere 30 or so neurons were producing such complex decisions.

Such a claim would be laughable. Humans have no understanding of how billions of neurons in a human brain could produce any such thing as thinking, understanding or decision making. To claim that complex decision making can come from only a very small number of neurons in a worm seems absurd, rather like thinking that someone with only a few dozen muscle cells could lift an air conditioner up above his head.

The writer of today's new story should have recognized that these results conflict with claims that minds are produced by brains. Instead, the results were repackaged to conform with the "brains make minds" dogma. So the beginning of the news story read like this:

"As scientists continue to discover more about the brain and how it works, it can help to know just how much brain matter is required to perform certain functions – and to be able to make complex decisions, it turns out just 302 neurons may be required."

See here for another example of complex thought from tiny animals (ravens). An article in Knowable Magazine suggests that tiny spiders are capable of complex thought. We read this:

"There is this general idea that probably spiders are too small, that you need some kind of a critical mass of brain tissue to be able to perform complex behaviors,' says arachnologist and evolutionary biologist Dimitar Dimitrov of the University Museum of Bergen in Norway. 'But I think spiders are one case where this general idea is challenged. Some small things are actually capable of doing very complex stuff.' Behaviors that can be described as 'cognitive,' as opposed to automatic responses, could be fairly common among spiders, says Dimitrov, coauthor of a study on spider diversity published in the 2021 Annual Review of Entomology."

In one test of intelligence, tiny mouse lemurs with brains 1/200 the size of chimpanzees did about as well as the chimpanzees We read this:

"The results of the new study show that despite their smaller brains lemurs' average cognitive performance in the tests of the PCTB was not fundamentally different from the performances of the other primate species. This is even true for mouse lemurs, which have brains about 200 times smaller than those of chimpanzees and orangutans."

This result is what we might expect under the hypothesis that brains do not make minds, but not at all what we would expect under the claim that brains make minds.

NEURONS AND SYNAPSES ARE:	
Very slow	Synaptic delays, synaptic fatigue and the slower transmission speed of dendrites should prevent brain signals from traveling at much more than a snail's pace of about a centimeter per second.
Very volatile and unstable	Synapses and dendtitic spines are made of proteins with lifetimes of only a few weeks or less, and the synapses and dendritic spines don't last for years, unlike memories lasting decades.
Very noisy	There are many types of noise in neurons and synapses which should strongly inhibit reliable signal transmission.
Not addressable	There is no position location system in the brain by which some exact neural location could be looked up by using its address, to achieve fast recall.
Signal-suppressive	A synapse in the cortex will transmit a signal with a likelihood of between .1 and .5, which means brain signals are constantly being suppressed.
Disorganized	Neurons are like the spaghetti mess in a huge cafeteria pot, and are not highly grouped into organizational units like letters in a book or computer components.
Indistinct	No one has discovered any distinctive marks or signs of encoded information in neurons or synapses other than the DNA information about the same in every cell.

at March 14, 2022 No comments:

Labels: intelligence of animals with small brains

Tuesday, March 8, 2022

US Government Gives Us Fake News About Brains and Memory

Courtesy of a sub-branch of the United States government, we have in today's science news an utterly bogus headline as phony as a three-dollar bill. The headline is "Researchers uncover how the human brain separates, stores, and retrieves memories." The headline appears in a press release published by the National Institute of Neurological Disorders and Stroke, a branch of the National Institutes of Health (NIH), a branch of the US government.

Scientists have no actual understanding of how memories form or how a human being is able to retrieve a memory. They have never been able to discover any credible coding mechanism or translation mechanism by which any of the main forms of human memories could be translated into neural states or synapse states. Computers have read-write heads to store information in particular places on a disk. The brain has nothing like a write component that could be used to store information in some particular part of the brain, and has nothing like a read component that could be used to read information from some particular part of the brain. Computers have indexing systems and addressing systems that allow the instant retrieval of stored information. No such thing exists in the brain, which has no indexing system, no addressing, no coordinate system and no position notation system. So the instant recall of a memory (given a single word or phrase) would seem to be impossible if such a recall occurs by the reading of neurons or synapses. As discussed here, the extremely abundant levels of noise in the brain should make impossible both the accurate storage of learned information in the brai and the accurate retrieval of learned information from the brain. And the many typically-overlooked slowing factors in the brain (such as synaptic delays) should make it impossible for a brain to be responsible for memory retrieval that can occur instantly. Given the very short lifetimes of synaptic proteins (1000 times shorter than the longest length of time humans can remember things), and the high turnover of dendritic spines, no one has been able to come up with a credible theory of how brains could store memories that can last for 50 years. Nor has any person been able to explain how the sluggish chemical operations in a brain could instantly form a memory, something humans routinely do. Learned memory information has never been discovered by examining any type of neural tissue. For example, not one single bit of a person's memory can be retrieved from a corpse or from some tissue extracted during brain surgery.

The study in question ("Neurons detect cognitive boundaries to structure episodic memories in humans") involved 20 epilepsy patients who had electrodes planted in their heads, presumably for medical reasons such as determining the source of their seizures. The patients were shown some videos, and some electrode readings were taken of electrical signals from their brain. In the press release we read the following:

"The researchers recorded the brain activity of participants as they watched the videos, and they noticed two distinct groups of cells that responded to different types of boundaries by increasing their activity. One group, called 'boundary cells' became more active in response to either a soft or hard boundary. A second group, referred to as 'event cells' responded only to hard boundaries. This led to the theory that the creation of a new memory occurs when there is a peak in the activity of both boundary and event cells, which is something that only occurs following a hard boundary."

I do not have access to the "Neurons detect cognitive boundaries to structure episodic memories in humans" paper, which is behind a paywall. But you can read for free the preprint of an identical-sounding paper by the same lead author (Jie Zheng) involving the same 20 epilepsy patients, the same claims, the same brain region (the medial temporal lobe), and the same experimental method involving taking electrode readings of brain signals while patients were watching videos. That preprint ("Cognitive boundary signals in the human medial temporal lobe shape episodic memory representation") is not very impressive.

The extremely dubious method followed was to arbitrarily select hundreds of neurons for study, and to look for some tiny subset of neurons with electrical activity that could be correlated (merely in some fraction-of-a-second blip way) with memory activity of the human subjects when "boundary conditions" of videos were shown, using the nickname "boundary cells" or "event cells" for such neurons. The number of such "boundary cell" neurons found was reportedly 7%. The first giant problem is that given many billions of neurons in the human brain, there is no reason to think that the arbitrarily selected set of hundreds of neurons had any involvement at all in the storage or retrieval of a human memory. In fact, there is a very strong reason for thinking that such neurons almost certainly would have had no involvement at all in the storage or retrieval of a human memory: the fact that a few hundred is such a tiny fraction of many billions.

The second giant problem is that there is every reason to suspect that the small percentage of supposedly correlated neurons found (reportedly 7%) is just what we would expect to be finding by chance, when examining neurons with random electrical signals having nothing to do with memory. The authors claim that chance would have produced a result of only 2% rather than 7%. But since the paper did not involve any blinding protocol (such as should have been used for a study like this to be worthy of our attention), we should not be impressed by such a difference. We do not know whether the 7% is an over-estimate arising from scientists seeing what they wanted to see in a biased analysis occurring partially because of a failure to follow a blinding protocol which would have reduced analytic bias. Also, we do not know whether the 2% is an under-estimate arising from scientists under-estimating things so that they could report a result that they wanted to report, in a biased analysis occurring partially because of a failure to follow a blinding protocol which would have reduced analytic bias.

A similar state of affairs holds in regard to the report of the detection of cells calls "event cells." The authors claim to have found that 6% of the studied hundreds of cells had some fraction-of-a-second correlation characteristic allowing them to be classified as "event cells," and they claim that only 2% of cells would have such characteristics by chance. But since the authors failed to follow any blinding protocol, we cannot have confidence in either of these numbers.

Under the very unlikely scenario that some meaningful difference in neuron response has been detected here, there is no particular reason to think that it is some neural sign of memory formation or memory retrieval. There are any number of reasons why brain cells might respond differently while videos are being shown, most of which have nothing to do with learning or memory. For example, a different visual stimulus can produce a different neural response, as can a different muscle movement or a fleeting emotion. We are told that the "boundary conditions" in the watched videos (supposedly producing different responses in the so-called "boundary cells") were accompanied by "sharp visual input changes." So any difference in neural response might have been merely a difference related to different visual perceptions, not something having to do with memory.

In short, no robust evidence has been provided in this preprint that any cells were involved in memory formation or memory retrieval, and since the "Neurons detect cognitive boundaries to structure episodic memories in humans" paper by the same lead author seemed to be identical in all the main features, there is no reason to think that such a study provided any evidence for a brain involvement in memory formation or memory retrieval.

Here is an excerpt from the press release touting the "Neurons detect cognitive boundaries to structure episodic memories in humans" paper, one that uses a faulty line of reasoning:

"The researchers next looked at memory retrieval and how this process relates to the firing of boundary and event cells. They theorized that the brain uses boundary peaks as markers for 'skimming' over past memories, much in the way the key photos are used to identify events. When the brain finds a firing pattern that looks familiar, it 'opens' that event.

Two different memory tests designed to study this theory were used. In the first, the participants were shown a series of still images and were asked whether they were from a scene in the film clips they just watched. Study participants were more likely to remember images that occurred soon after a hard or soft boundary, which is when a new 'photo' or 'event' would have been created.

The second test involved showing pairs of images taken from film clips that they had just watched. The participants were then asked which of the two images had appeared first. It turned out that they had a much harder time choosing the correct image if the two occurred on different sides of a hard boundary, possibly because they had been placed in different 'events.'

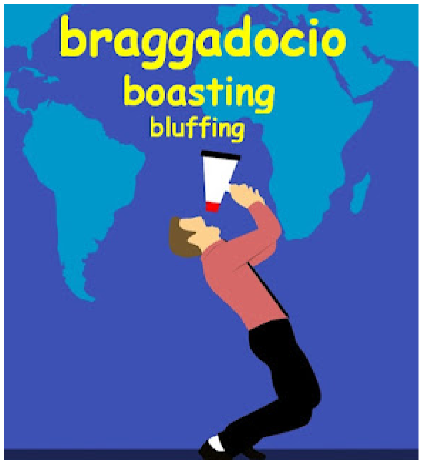
These findings provide a look into how the human brain creates, stores, and accesses memories."

There is no justification for claiming that the experiments discussed in the quote above tell us anything about the brain. The experiments discussed in the quote above are psychology experiments involving only human mental performance, without any measurement of the brain. What we see here is a trick that materialists frequently use: use some experimental results that do not involve any brain reading or brain scanning or brain measurement, and then claim that such results tell you something about the brain. When experimental results merely tell us that humans perform in such-and-such a way, or merely tell us that minds perform in such-and-such a way, we have no warrant for saying that such results tell us that the brain is performing in such-and-such a way.

Not one single bit of robust evidence has been provided in the press release that any understanding has occurred as to how a brain could store or retrieve a memory, nor has any robust evidence been provided for the claim that brains store or retrieve memories. All of the old reasons for rejecting such claims remain as strong as ever.

In today's NIH press release we have an extremely untrue statement saying, "This work is transformative in how the researchers studied the way the human brain thinks." No, the study described is just another example of a dubious neuroscience research design like I have seen countless times before. The study was funded by the NIH's Brain Initiative, and the PR people of that project have before often groundlessly used the word "transformative" for meager research results. I quote from a previous post of mine discussing the lack of major progress made by the Brain Initiative:

"So far the BRAIN Initiative has been running for four or five years, and has accomplished nothing extremely noteworthy. Our understanding of the brain has not dramatically advanced during those four or five years, and all the old mysteries of mind and memory seem as mysterious as ever.
At this 'Achievements' link there is a discussion of what the BRAIN Initiative has accomplished so far. At the top of the text is a big bold headline saying 'Transformative Advances,' but the BRAIN Initiative has produced no such transformative advances. Go beyond the flashy spin on the web site, the high-tech glitter, and the discussion of things in progress that haven't yet yielded much, and you have not a single major accomplishment relating to our understanding of the mind or memory. You see in this section a video entitled 'The BRAIN Initiative – the First Five Years.' The video fails to list a single accomplishment of the BRAIN Initiative. Apparently all this work to mechanistically explain the mind is pretty much a flop and a failure so far."



Below is an extremely relevant quote from the well-worth-reading paper "A Call for Greater Modesty in Psychology and Cognitive Neuroscience":

"A romantic view holds that science is built on different values, such as integrity and honesty, as well as different systems of operation that mandate a dispassionate, calculated and systematic pursuit of the 'truth'. However, such a view of science is naïve. The incentive structure of modern science is such that a 'simplify, then exaggerate' strategy has become dominant, even if only tacitly. To get published in leading journals, to be awarded grants and to be hired as a postdoc or faculty member, a system-wide bias for novelty, exaggeration and storytelling has emerged ***(Huber et al., 2019; Nosek et al., 2012)****. The prizing of novelty over quality represents one overarching driver in the construction of a research culture beset by the widespread use of questionable research practices and low levels of reproducibility* ***(Chambers, 2017; Munafò et al., 2017; Nelson et al., 2018; Open Science Collaboration, 2015; Simmons et al., 2011)****. Indeed, although there have arguably been recent successes* ***(Shiffrin et al., 2018)****, many aspects of modern psychology and brain science resemble a creative writing class as much as a systematic science of brain or mind."*

at March 08, 2022 2 comments:

Labels: overblown hype

Wednesday, March 2, 2022

No Solid Principle Justifies "Brains Make Minds" Thinking

In the posts on this blog, I have shown that the facts do not justify conventional claims that the brain is the source of the human mind, and claims that memories are stored in brains. But could there be some kind of general principle that justifies thinking that brains make minds? Let's look at some possible principles, and see how well they stand up to scrutiny.

One possible principle that could be evoked to try to justify "brains make minds" claims is a principle that physical effects must be explained by physical causes. But this is not a defensible principle to justify "brains make minds" thinking. For one thing, mental effects such as thinking and understanding are not physical effects. Secondly, it would seem that many physical effects are not caused by physical causes, but are instead caused by mental causes. If John becomes enraged at Joe, and punches Joe, that is not a physical cause causing a physical effect, but a mental effect causing a physical effect.

Another possible principle that could be evoked to try to justify "brains make minds" claims is a principle that mental effects must be explained by physical causes. But this is not a defensible principle to justify "brains make minds" thinking. Consider this case: John becomes very sad because his true love Mary has become very sad. This would seem to be a case of a mental effect being produced by another mental effect, and countless other examples of such a thing could be given. It would not seem to be true that mental effects must always be explained by physical causes.

Another possible principle that could be evoked to try to justify "brains make minds" claims is a principle that scientists must never explain things by imagining invisible causes. A person could evoke this principle, and then say, "So rather than evoking some invisible cause for things mental, we must think of a visible cause: the brain." But this is not a defensible principle to justify "brains make minds" thinking. The fact is that outside the world of neuroscience, scientists often evoke invisible causes to explain things.

To explain the movements of bodies in the solar system, scientists evoke a universal law of gravitation. Gravitation is very much an invisible cause. You can observe someone falling from gravity, but the force of gravitation is itself invisible. To give another example, cosmologists (scientists who study the universe as a whole) habitually evoke two never-observed invisible things as explanations: dark matter and dark energy. Such invisible and never-observed things are pillars in the explanation systems of cosmologists. So it simply isn't true that scientists must never explain things by imagining invisible causes. If neuroscientists were to stop telling us that our brains make our minds, and were to start teaching that our minds arise from some mysterious "mind source" external to our bodies, this would be nothing very different from what cosmologists have been doing for decades, by appealing to invisible never-measured dark matter and dark energy.

Another possible principle that could be evoked to try to justify "brains make minds" claims is the long-standing principle of Occam's Razor. This was originally stated as the principle that "entities should not be multiplied beyond necessity." One could appeal to the Occam's Razor principle when trying to justify a belief that brains make minds. The reasoning might go like this:

"If we imagine that a brain is the cause of all of the mind and the storage spot of memory, that is simpler than imagining some soul is involved. For if you imagine a soul, you must also imagine some soul-giver or a soul source; and then you are postulating two things, not just one (a brain). But it is better to avoid postulating multiple things if you can postulate only one thing. That's the long-standing principle of Occam's Razor."

This argument is fallacious because it misstates Occam's Razor. According to the wikipedia.org article on Occam's Razor, the principle is inaccurately paraphrased as the principle that "the simplest explanation is usually the best one." It is not a valid principle that we should always prefer the simpler explanation or the simplest explanation. For example, if we imagine atoms as being hard indivisible particles as some ancient thinkers did, that is simpler than imagining atoms as usually being structured of multiple electrons, protons and neutrons. But in this case the more complicated explanation postulating more things is the correct one.

Occam's Razor is the principle that "entities should not be multiplied beyond necessity," and that "beyond necessity" part is a crucial part of the principle.

Occam's Razor is the principle is that we should not assume additional causal factors unless *we need to do so*. Below are some examples of correct and incorrect applications of Occam's Razor:

(1) A man was shot in the back when a rifle bullet tore into his flesh. Should we assume that two people pulled the trigger, or only one? You don't need two people to pull a trigger. So according to Occam's Razor, we should assume only one person pulled the trigger.

(2) A man was killed when he was simultaneously shot in the back and also struck by an arrow that hit him in the front. We cannot evoke Occam's Razor to say there was only a single killer. Here there is a necessity for postulating multiple causes. So it is quite consistent with Occam's Razor for us to assume there were two killers, one shooting from the front, and another shooting from the back.

In the case of the mind and the brain, there are multiple necessities for assuming that the mind arises from something beyond the brain. They include the very short lifetime of proteins in the brain (about 1000 times shorter than the longest length of time old people can remember things), the rapid turnover and high instability of dendritic spines, the failure of scientists to ever find the slightest bit of stored memory information when examining neural tissue, the existence of good and sometimes above-average intelligence in some people whose brains had been almost entirely replaced by watery fluid (such as the hydrocephalus patients of John Lorber), the lack of any indexing system or coordinate system or position notation system in the brain that might help to explain the wonder of instant memory recall, the good persistence of learned memories after surgical removal of half a brain to treat severe seizures, the ability of many "savant" subjects (such as Kim Peek and Derek Paravicini) with severe brain damage to perform astounding wonders of memory recall, the fact of very vivid and lucid human experience and human memory formation in near-death experiences occurring after the electrical shutdown of the brain following cardiac arrest, and the complete lack of anything in the brain that can credibly explain a neural writing of complex learned information, a neural reading of complex learned information, or a neural instant retrieval of learned information.

So you cannot credibly evoke Occam's Razor to defend a belief that the mind is merely a product of the brain. Such a principle only applies to discourage cases when multiple causes are evoked "beyond necessity." But for the reasons above we seem to have many a necessity for postulating some cause of the mind beyond the brain.

Another principle that could be evoked to try to justify "brains make minds" claims is the principle that every characteristic of something must be explained in terms of the internal components of that thing. Unfortunately, this principle is not a valid one, as the examples below show:

- The motion behavior of planet Earth is not at all explained purely by some internal components of our planet. The motion behavior of planet Earth through the solar system is caused mainly by things outside of planet Earth, such as the sun and the universal law of gravitation which causes the sun to have a gravitational influence on the motion of Earth.
- The temperature of planet Earth is not at all explained purely by some internal components of our planet. The temperature of our

planet is mainly explained by an external influence: the heat that comes from the sun.
- A person's opinions and behavior are not at all explained purely by some internal components of his body. Such opinions and behavior are largely determined by factors (such as social influences) coming from beyond the person's body.

It is simply not true that scientists always explain something purely by discussing internal parts of that thing. Scientists frequently maintain that the main explanation for something's characteristics are causal factors outside of that thing.

Another principle that could be evoked to try to justify "brains make minds" claims is a "follow the consensus" principle. It could be argued that there is a scientific consensus that memories are stored in brains, and that the mind is merely the product of the brain; so we should believe that. But there are problems with this argument.

"Consensus" is one of the most abused words in scientific discourse. Very confusingly defined in multiple ways, "consensus" is a word that some leading dictionaries define as an agreed opinion among a group of people. The first definition of "consensus" by the Merriam-Webster dictionary is "general agreement: unanimity." We have no proof that there is any actual consensus among scientists that brains make minds or that brains store memories. To the contrary, there are signs of serious doubts about such a claim. In science literature these days it is often said that the problem of consciousness is an unsolved problem. Elsewhere we read scientists flirting with panpsychism, an explanation for consciousness different from the idea that your brain produces consciousness.

Let us consider a very interesting type of alleged consensus that I may call a "leader's new clothes" consensus. Let us imagine a small company of about 20 employees that has a weekly employee meeting every Monday morning. On one Monday morning after all the employees have gathered in a conference room for the meeting, the company's leader comes in wearing flashy new clothes that are both very ugly and ridiculous-looking. Immediately the leader says, "I just paid $900 for this new outfit -- raise your hand if you think I look great in these clothes."

Now if it is known that the leader is someone who can get angry and fire people for slight offenses, it is quite possible that all twenty of the employees might raise their hand in such a situation, even though not one single one of them believes that the leader looks good in his ugly new clothes. In such a case the "public consensus" is 100% different from the private consensus. A secret ballot would have revealed the discrepancy.

The point of this example is that appeals to some alleged public consensus are notoriously unreliable. So arguing from some alleged consensus of some group is a weak and unreliable form of reasoning. The only way to get a reliable measure of the opinion of people on something is to do a secret ballot, and there virtually never occurs secret ballots of scientists asking about their opinions on scientific matters. We have no idea of whether the private beliefs of scientists differ very much from the public facade they present. For example, we have no idea whether it is actually true that almost all scientists think your mind is merely the product of your brain. It could easily be that 35% of them doubt such a doctrine, but speak differently in public for the sake of "fitting in," avoiding "heresy trouble" and seeming to conform to the perceived norms of their social group.

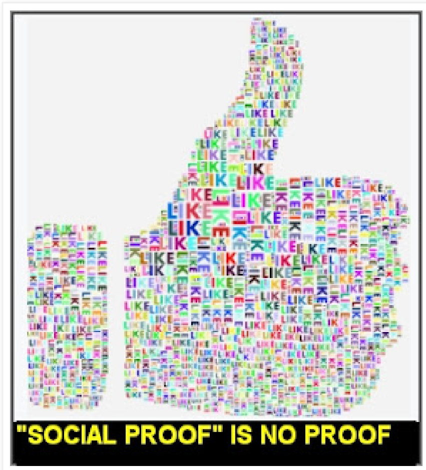
The history of science shows many "consensus beliefs" that were later discarded. Less than a century ago, eugenics was once wildly popular in US colleges, but now stands in disrepute. It was once a reputed scientific consensus that homosexuality was a mental illness. Now anyone claiming that in a college would be condemned by his college superiors. To give another of many other examples I could cite, Semmelweis accumulated evidence that cases of a certain kind of deadly fever could be greatly reduced if physicians would simply wash their hands with an antiseptic solution, particularly after touching corpses. According to a wikipedia.org article on him, "Despite various publications of results where hand washing reduced mortality to below 1%, Semmelweis's observations conflicted with the established scientific and medical opinions of the time and his ideas were rejected by the medical community." Thousands died unnecessarily, because of the stubbornness of experts, who were too attached to long-standing myths and cherished fantasies such as the idea that physicians had special "healing hands" that would never be the source of death. The wikipedia article tells us, "At a conference of German physicians and natural scientists, most of the speakers rejected his doctrine, including the celebrated Rudolf Virchow, who was a scientist of the highest authority of his time." Decades later, it was found that Semmelweis was correct, and his recommendations were finally adopted. The wikipedia.org article notes, "The so-called Semmelweis reflex — a metaphor for a certain type of human behavior characterized by reflex-like rejection of new knowledge because it contradicts entrenched norms, beliefs, or paradigms — is named after Semmelweis, whose ideas were ridiculed and rejected by his contemporaries."

More recently, in the year 2020 we were told countless times in the mainstream press that there was a scientific consensus that COVID-19 had arisen through a purely natural process, spreading from some animals that had the virus before humans. This alleged scientific consensus held for only about a year, until 2021, when many scientists started to confess that we don't know whether COVID-19 did or did not arise from a lab leak. Below is from a Reuters article on a US government report on COVID-19 origins:

"The ODNI report said four U.S. spy agencies and a multi-agency body have 'low confidence' that COVID-19 originated with an infected animal or a related virus. But one agency said it had 'moderate confidence' that the first human COVID-19 infection most likely was the result of a laboratory accident, probably involving experimentation or animal handling by the Wuhan Institute of Virology."

Results such as this should shake our confidence in the idea that there is something compulsory about some alleged scientific consensus. People tend to think that today's scientists have got things right because they have "state-of-the-art" equipment. Centuries from now (armed with vastly more sophisticated tools) scientists may look back on today's scientists the way today's scientists look back on 17th-century scientists, and think things like, "I can't believe way back then they were trying to figure out the mind by using those silly MRI machines." Such scientists of the future may scorn today's community of neuroscientists, regarding it as a dysfunctional culture plagued by poor practices, overconfidence and hubris.

To put things concisely, social proof is no proof, and "follow the herd" does not necessarily lead you to the truth.



Another principle that could be evoked to try to justify "brains make minds" claims is a principle that scientists must only believe in things natural, so we can't believe in something supernatural (such as a soul that could explain the human mind). The principle is far from a self-evident one. Given sufficient evidence for the supernatural, it would seem that scientists should believe in that, because their supreme rule should be "follow the evidence wherever it leads" rather than "only believe in things you think are natural." Secondly, believing in some non-neural cause of the human mind does not necessarily require a belief in the supernatural. Humans could get something like a soul by means of some mysterious cosmic infrastructure that in some sense operates "naturally," rather than by one-by-one miraculous dispensations. So believing in a non-neural source of the human mind does not necessarily require you to believe in something miraculous or supernatural.

In short, there is no sound general principle that can be evoked to justify thinking that the human mind is mainly a product of the brain, and that the brain is the storage place of memories.

at March 02, 2022 2 comments:

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Head Truth

The huge case for thinking minds do not come from brains

Thursday, February 24, 2022

The Press Often Gives Us Fake News About Brains

A significant fraction of the neuroscience news these days contains exaggerations, extremely dubious interpretations or downright falsehoods. Sometimes these falsehoods are so brazen that they must be branded as fake news. An outrageous example of fake news was a recent story in the British new source The Independent, a story with the phony headline, "Brain scan reveals patient's 'last thoughts' just before they died in landmark study." Below are some of the reasons the headline and the story are as phony as a three-dollar bill:

- The scientific study made no claim to have revealed the thoughts of the dying 87-year-old patient, nor did it even make any guess about such a thing.
- No one is quoted in the article referring to last thoughts.
- The headline uses the phrase "just before they died," suggesting there were multiple patients involved in the new study; but there was only one patient.
- The patient did not actually have his brain scanned as he died. Brain scans are done with MRI machines, and the patient was not being scanned in an MRI machine or any similar machine when he died. Instead, there was a merely a reading of electrical activity by means of EEG electrodes.
- There was nothing "landmark" about the study, as there have been electrode readings of the brain activity of numerous previous patients as they died. The subtitle of the story makes the untrue claim that there were "first-of-a-kind brain scans," when nothing "first-of-a-kind" was done, and no brain scan was done.
- As discussed below, there are very strong reasons for assuming that the patient in question was unconscious in the moments before death, and that he therefore was not thinking about anything just before dying.

We don't need to read very far to find out how phony the story is. The headline claims "brain scan reveals patients 'last thoughts,'" but the subtitle states this: "First-of-a-kind brain scans of dying person indicate they may have been making 'last recall of life', scientists say." So the headline and the subtitle contradict each other. If scientists were merely speculating that the patient may have been recalling his life, then nothing has been actually *revealed* about what the patient was thinking. Of course, the idea that you can figure out someone's thoughts by looking at EEG readings is as nonsensical as the claim

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that you can find out someone's future life events by reading lines on his palms. EEG readings are mere squiggly lines without any semantic content.

The untrue "first-of-a-kind" claim is partially the fault of the Frontiers press release, which made this untrue claim: "This unexpected event allowed the scientists to record the activity of a dying human brain for the first time ever." You can very easily find out how untrue this claim is by using a Google search phrase of "EEG reading of dying patient," and using the Tools option to restrict the search results to be from 1/1/1990 to 1/1/2021. In your search results you will get papers such as the 2017 paper "Electroencephalographic Recordings During Withdrawal of Life-Sustaining Therapy Until 30 Minutes After Declaration of Death," and this 2017 press article about the study (which shows some of the EEG readings from four dying patients).

Besides making the untrue claim above, the Frontiers press release is guilty of getting the ball rolling on this fake news story, by suggesting the utterly groundless idea that the EEG readings from a seizure-wracked dying patient in a coma did something to suggest the patient was recalling events in his life. Here is a quote from the press release:

" 'We measured 900 seconds of brain activity around the time of death and set a specific focus to investigate what happened in the 30 seconds before and after the heart stopped beating,' said Dr Ajmal Zemmar, a neurosurgeon at the University of Louisville, US, who organised the study. 'Just before and after the heart stopped working, we saw changes in a specific band of neural oscillations, so-called gamma oscillations, but also in others such as delta, theta, alpha and beta oscillations.' Brain oscillations (more commonly known as 'brain waves') are patterns of rhythmic brain activity normally present in living human brains. The different types of oscillations, including gamma, are involved in high-cognitive functions, such as concentrating, dreaming, meditation, memory retrieval, information processing, and conscious perception, just like those associated with memory flashbacks. 'Through generating oscillations involved in memory retrieval, the brain may be playing a last recall of important life events just before we die, similar to the ones reported in near-death experiences,' Zemmar speculated. "

Notice the nonsense reasoning here. It's basically this:

(1) People have different types of brain waves, which occur when they do various things like thinking, recalling, meditating (which does not involve recall), and perceiving.

(2) Some brain waves were measured in a person who died.

(3) So maybe he was recalling important life events.

This is nonsensical logic. The study has not provided the slightest reason for thinking that the dying person was remembering past events in his life. To the contrary, we can think of the strongest reason why a person would not be recalling important life events after having a sudden heart attack. The sudden heart attack would produce great pain and great distress, and under such conditions if you were conscious you would be no more likely to be recalling past life events than you would be if someone suddenly stabbed you in the chest. In fact, sudden fatal heart attacks instantly produce unconsciousness which should prevent anyone from engaging in thinking about past events.

The scientific paper describes the patient's condition before death, and we learn of a state so dire that any speculation about the patient reliving past memories seems supremely absurd. We are told the patient was a 87-year-old who had suffered a fall, and who was in a coma (rating 10 on the Glascow Coma Scale, meaning a moderate coma). Here is how the paper describes the patient's death.

"An electroencephalography (EEG) was obtained, which showed non-convulsive status epilepticus in the left hemisphere. There were at least 12 identified electrographic seizures, after which a burst suppression pattern spontaneously developed over the left hemisphere (Figure 2A). Shortly thereafter, electrographic activity over both hemispheres demonstrated a burst suppression pattern, which was followed by development of ventricular tachycardia with apneustic respirations and clinical cardiorespiratory arrest. After discussion with the patient's family and in consideration of the 'Do-Not-Resiscitate (DNR)' status of the patient, no further treatment was administered and the patient passed away."

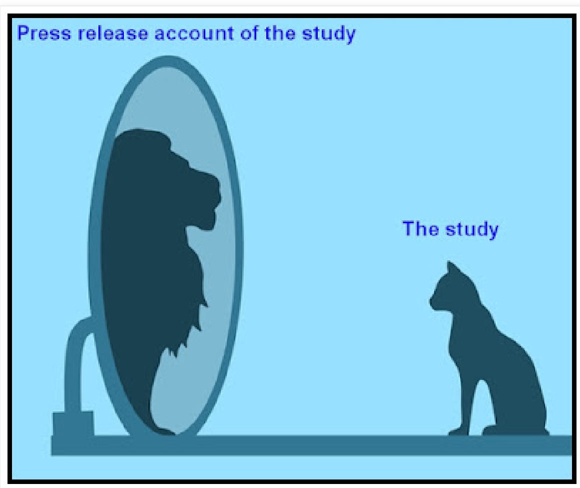
Given such a patient state, it is obvious folly to be speculating that such a patient was reliving past memories just before death. Status epilepticus is a life-threatening seizure of particularly long length. Apneustic respirations are a kind of gasping suggesting death is very near. Twelve seizures would have produced a "witch's brew" of brain signals showing up on EEG readings, and from such a thunderstorm of brain signals nothing reliable can be inferred about what a patient was thinking or recalling. Since the patient was in a coma and plagued by a dozen seizures that disrupt mental processes such as recollection if it is occurring, it makes no sense at all to speculate that the patient was thinking about or recollecting anything.

Giving us a headline as phony as the headline quoted above from the Independent, the Daily Mail gives us this fake news headline about this patient: "Our lives really DO flash before us: Scientists record the brain activity of an 87-year-old man at the moment he died, revealing a rapid 'memory retrieval' process." This headline is as phony as a three-dollar bill. Zero evidence has been provided in the scientific paper of any memory retrieval around the time of death, and the patient's condition gives the strongest reason for disbelieving that any such thing was occurring. A similar fake news headline occurs on www.bbc.com, showing that once an expert lights a fake news match, the fake news fire will spread even to sources the average person regards as having high journalistic standards.

There is an abundance of reliable evidence that people have extraordinary near-death experiences after their hearts have stopped. Such experiences often include what are called life-review experiences, in which a person may recall important moments from his life. Neuroscience has done nothing to explain such near-death experiences.

The fact of such experiences is a major reason for rejecting all claims that human consciousness is a product of the brain, and that memories are stored in brains. According to such claims, no one should have any mental experiences at all other than unconsciousness after his heart stops. Within a few seconds after a heart stops, a brain shuts down its electrical activity. This was shown by the 2017 paper I previously mentioned, "Electroencephalographic Recordings During Withdrawal of Life-Sustaining Therapy Until 30 Minutes After Declaration of Death," Figure 1 of that paper shows EEG readings of four patients for thirty minutes after their hearts stopped. The readings are flat lines, except for three or four little blips that can be compared to momentary muscle twitches of a corpse a few minutes after death. The Zemmar study does nothing to challenge ideas that brains promptly shut down as soon as a heart stops.

On the same day that we had the fake news headlines quoted above, we had another fake news headline, one that declared, "New project creates digital clones of human brains to help treat neurological disorders." No one has created any such thing as a digital clone of the human brain. We can also be quite confident that no one ever will do such a thing, because the act of measuring all of the synapse states and neuron states of a brain would inevitably kill a person, or require the cutting away of so much tissue that you would never be left with a clone of the person's original brain state. In the text of the story we read that the work being done is merely the creation of some "virtual model," something not at all a clone of the brain.



Postscript: Vice.com tries to squeeze some more juice out of the fake news story about the dying 87-year-old. It gives us an article with the misleading title "The Search for Meaning in a Mysterious Brain Signal at Death." There was nothing mysterious about the brains signals recorded. There are some good aspects of the Vice.com story. The story quotes a doctor named Chalwa:

" 'They have no idea what that guy is experiencing,' Chawla said. It'd be different if the man survived, and reported that he experienced a recall of memories. But since he died, we have no idea what happened. To say otherwise, 'is frankly appalling,' Chawla said."

Correct -- the behavior of so many people in this matter is truly appalling and unprofessional.

at February 24, 2022 No comments:

Labels: near death experiences, science journalism

Tuesday, February 15, 2022

Beware of Neuroscientists Using Cell Nicknames

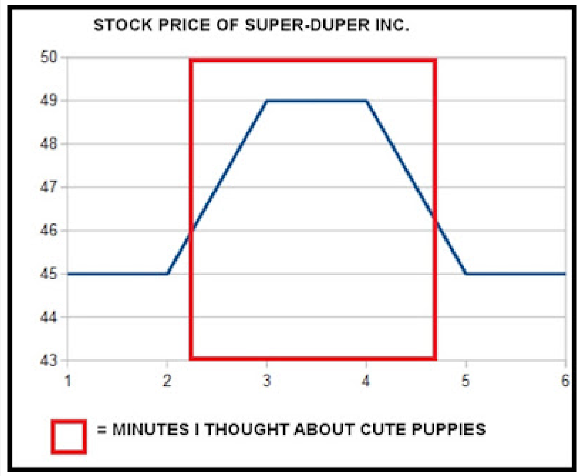
Today is a typical day in the science news, because we see what we so often see: a press report claiming that neuroscientists have discovered something they have not actually discovered. The report is a press release from the University of Bonn with this headline: "'Math neurons' identified in the brain." Below this we have a subtitle reading, "When performing calculations, some neurons are active when adding, others when subtracting." While we know that humans can perform math calculations, there is no evidence that either brains or neurons perform math calculations. Guilty of serious methodological flaws, the scientific study in question has not found any good evidence that some neurons are more active than other neurons during math calculations.

The study (entitled "Neuronal codes for arithmetic rule processing in the human brain") can be read in full here. Nine epilepsy patients had electrodes attached to areas of their brains for medical reasons to determine the source of seizures they were having. Using such subjects, scientists attempted to find signs of greater activity in certain areas of the brain while the subjects performed a math task. Such a sample size of nine subjects was too small for a robust result. Fifteen subjects per study group is the minimum for a moderately persuasive result. When you use fewer than 15 subjects in a study group, there is a too high a chance of a false alarm.

The scientists recorded the electrical activity of about 600 neurons in each subject. They claim that a small percentage (about 5%) fired at a greater rate during addition or subtraction. But we would expect to get such a result by chance. Similarly, if I track for twenty minutes the minute-to-minute ups and downs of 600 stocks being traded on the New York Stock Exchange, and look for stocks that rise in price while I am thinking about cute puppies, I will probably be able to find that about 5% of the stocks seemed to have higher prices when I am thinking about cute puppies. This does nothing whatsoever to show that my thoughts about cute puppies have any influence on stock prices. I would in such a case have merely found a chance correlation that I would expect to get when comparing two unrelated things that fluctuate (stock prices and the objects of my attention). In all likelihood this is all that has turned up in the new "Neuronal codes for arithmetic rule processing in the human brain" study. The authors have merely found the type of chance correlation in electrical activity that we would expect to see in some small percentage of neurons (maybe 5% or so) when comparing the ups and downs of that electrical activity to something else that does not affect such electrical activity. No robust evidence has been provided of any causal effect.

Figure 2 of the paper is a line graph showing the ups and downs of the firing rate of four neurons, with two of the neurons showing increased activity during math calculation. The caption of the graph says it is showing activity for "four example neurons." When we remember that the electrical activity of about 600 neurons was tracked, we should not regard Figure 2 as being evidence for any causal effect. The authors probably cherry-picked some neurons out of their set of about 600, looking for a few with an electrical activity that seemed to rise during math calculation.

Similarly, if I did my experiment tracking the minute-to-minute price fluctuations of 600 stocks, while I was thinking about cute puppies, I could cherry-pick one stock with the strongest chance correlation, and produce a graph like the one below, similar to the graphs in Figure 2 of the paper.



How is it that we can judge whether a study like this has given robust evidence of anything (as opposed to showing only variations we would expect to get by chance)? We can look for 4 different things:

(1) **Pre-registration**. When pre-registration is used, scientists publicly pledge beforehand how data will be gathered and analyzed, reducing the chance the authors will be doing a kind of a "fishing expedition" in which they feel free to keep "slicing and dicing" the data dozens of ways until it seems to show the desired result: an approach that may be described as "keep torturing the data until it confesses."

(2) **A blinding protocol.** A blinding protocol is used to reduce the chance of experimental bias, an effect in which experimenters tend to see or find whatever result they hope to see.

(3) **Control groups**. When control groups are used, there are a group of subjects who do not receive the stimulus being applied to the main experimental group. The reaction of the group receiving the stimulus can be compared to a group that did not receive the stimulus.

(4) **Adequate sample sizes.** An experiment should include a sample size calculation to determine the minimum number of subjects needed to provide robust evidence of a real effect. If such a calculation is not done, we should expect 15 subjects per study group as a minimum.

The new "Neuronal codes for arithmetic rule processing in the human brain" study fails on all these quality measures. The study was not a pre-registered study. The study failed to use any blinding protocol, and the paper does not use the word "blind" or "blinding." The sample size used (nine) is smaller than the minimum of 15 needed for a robust experimental result, and no mention is made of a sample size calculation. Although the paper uses the word "control" multiple times, the study did not use control groups. The use of a control group would have clarified that the main result reported is meaningless. In the control group we would have seen about 5% of neurons with increased activity when the subjects were not asked to do any math work. This would have helped make clear that the reported variations are merely chance variations, not actually evidence of "math neurons."

Being guilty of several methodological defects, the new "Neuronal codes for arithmetic rule processing in the human brain" study fails to provide any good evidence that there are "math neurons" in the brain, and fails to provide any

- Don't Be Fooled: Well-Trained Chatbots Aren't Minds
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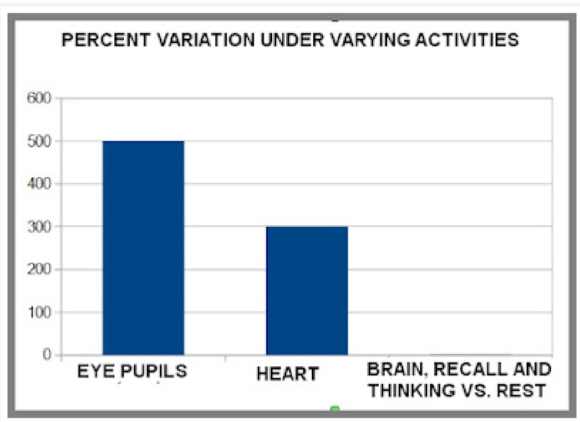
- Longtermism Is Fueled by a Goofy Belief in Computer-Generated Lives
- Given Their Narrow Studies and Slim Narrow PhD Dissertations, Why Are We So Swayed by Neuroscience PhDs?
- Some of the Weak Papers Neuroscientists Cite As Evidence for Their Chief Claims
- For Insight About Your Brain and Mind, Ponder the Never-Founds
- TV Medical Dramas Give Us Wrong Ideas About Minds and Death
- Brain Imaging Shows No Appreciable Neural Correlates of Memory Activity
- The Evidence Inversion Syndrome Blights Academia
- Poorly Designed Brain Scan Experiments Needlessly Put the Needy at Risk
- Science Literature Is Full of Misleading Claims About Brain Waves
- The US Government's False Claims About DNA
- If Neuroscientists Acted Like Cosmologists, They Might Say You Have an Invisible "Dark Brain"
- Exceptionally Fast Thinking Cannot Be Explained by Slow Brains Like We All Have
- Scientists and Clergy Have Much in Common
- 30 Things That Would Never Occur If Prevailing Neuroscientist Dogmas

good evidence of any such thing as "neuronal codes for arithmetic rule processing." Similar problems will be found in studies claiming to provide evidence for "time cells" and "place cells" in the brain, as discussed here and here.

The same type of methodological defects are found in another memory study released this week. Its press release groundlessly claims, "In a scientific first, researchers at the University of California, Irvine have discovered fundamental mechanisms by which the hippocampus region of the brain organizes memories into sequences and how this can be used to plan future behavior." A look at the Nature paper shows that a way-too-small sample size was used (only five rats), that no blinding protocol was used, that no control group was used, and that the scientists used some incredibly complicated "keep torturing the data until it confesses" approach that they presumably made up as they went along (since the paper makes no mention of pre-registering an exact hypothesis and pre-registering data collection and analytic methods).

A brain scan study looked for neural correlates of math calculation in adults and children, using a much better sample size of 20 adults and 80 children. As shown in Figure 2, the study found brain activity variations of only about 1 part in 200 or smaller, which is about what we would expect to have got purely by chance, even if the brain is not involved in calculating. The bar chart below puts such results in perspective.



at February 15, 2022 No comments:

Labels: neuron nicknames

Saturday, February 12, 2022

New Study Confesses "Relationship Between Brain Structure and Function and Cognitive Function Is Still Largely Underexplored"

For decades neuroscientists have taught or attempted to suggest the unwarranted claim that brain scans suggest the human brain is the source of human cognition. Given the great numbers of such claims that have been made over the past several decades, a reader may be surprised to read that a new scientific paper states, "We report the first systematic review that assesses how information from structural and functional neuroimaging methods can be integrated to investigate the brain substrates of cognition." This should raise our suspicions that brain imaging can help establish that cognition is produced by brains. If such a claim is true, why is it only now (in the year 2022) that we would be seeing "the first systematic review that assesses how information

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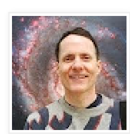

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from structural and functional neuroimaging methods can be integrated to investigate the brain substrates of cognition"? Such reviews should have been done *before* any claims were made that brain imaging helps show the brain is the source of human cognition, not *after* such claims had been made for decades.

We seem to have here in such "jumping the gun" behavior another example of what biologists have very long been guilty of: claiming some triumph has been achieved before they have achieved necessary prerequisites of such a claim, like some mother claiming that her small baby can run before the baby has even learned how to crawl or walk. Something similar went on in discussing human origins, with biologists boasting for many decades that they had successfully explained the origin of the human race, when they had not achieved some of the most important prerequisites that should have been achieved before making such a claim (such as understanding the molecular nature and organization of protein molecules, the structural organization of cells, and the still not-understood riddles of the origin of language and the morphogenesis origin of an immensely organized adult human body from the million-times simpler simplicity of a single fertilized ovum).

After its abstract the new paper ("Relating cognition to both brain structure and function: A systematic review of methods") starts out by giving us a classic example of what occurs so very often in neuroscience papers: an invalid citation in which some dubious claim is followed by a reference to a paper that did not establish such a claim. We read, "Cognitive function and adaptive behaviour rely on structure and dynamics of largescale neural networks (Friston, 2002)." The citation is to a paper that merely states, "We try to show that learning can be implemented in a biologically plausible way."

After getting 1923 papers from database searches, and removing 251 duplicates, the new study had 1673 papers. An assessment "for eligibility" reduced this total to only 159 papers, and a further application of quality criteria reduced this number to only 102. Such extremely high rates of exclusion should raise our suspicions. Why did only 102 out of 1923 papers meet the study's eligibility and quality criteria standards? This is what we might expect if the vast majority of experimental neuroscience papers are using faulty methods or making invalid claims.

It seems that the number of papers that *should* have been excluded would have much higher. The new paper lists four reasons why it excluded papers. None of the reasons listed are one of the top problems with experimental neuroscience papers these days. Such reasons include the following:

(1) A failure to do a sample size calculation needed to determine the number of subjects needed for a robust result.

(2) The use of too-small study group sizes, in which the number of subjects is less than the minimum (about 15) needed for a moderately persuasive result.

(3) A failure to declare and implement a thorough blinding protocol to prevent experimental bias in which the experimenters tend to find whatever result they were hoping to find.

(4) A failure to pre-register a detailed plan for gathering and analyzing data, leaving researchers with freedom to run a "fishing expedition" kind of study in which they can "slice and dice" data in countless different ways until they find a result they were hoping to get.

How many of the 102 papers would have survived a quality check excluding papers with such methodology flaws? Probably very few, because the prevalence of poor methodology is epidemic in neuroscience these days, with most experimental studies being guility of two or more of these failures. Then there is the fact that according to a pie chart in the new paper, only about one quarter of the 102 papers used "direct inference," with about half using some "indirect inference" method that is less reliable than direct inference.

In the new paper's summary we have this confession, which should raise further doubt in anyone thinking brain scans have supported claims that brains make minds. We read this:

"First, it became apparent that fMRI protocols have taken clear dominance over other functional imaging techniques in this research field. As mentioned in the introduction of this review, fMRI method suffers from low temporal resolution and is not a direct measure of neural activity."

You should never expect to get in a neuroscience paper a really candid discussion of how the boasts of neuroscience do not match experimental results. Neuroscientists are members of a conformist belief community, and within such a community there are taboos that cannot be violated and speech customs which scientists are pressured into following. But in the last paragraph of the new paper we do get a kind of watered-down confession about the shortfall of neuroscientists in proving their belief dogmas. We read this: "This review demonstrated that the relationship between brain structure and function and cognitive function is still largely underexplored." A more candid statement would have stated, "The relationship between brain structure and function and cognitive function has not yet been established."

The study here gives a rather interesting poll of neuroscientists. There are some surprising answers. Based on their standard claims about brains and minds, we would expect close to 100% of neuroscientists would agree with this statement: "If it were possible to transplant our brain to another body we would still be ourselves, albeit in a new body." The actual percentage of polled neuroscientists who agreed with this statement was only 51%. Could this be because deep down inside a large fraction of our neuroscientists don't really believe some of the things they teach? I don't know.

Also interesting was the fact that only 6% of the polled neuroscientists agreed with the statement that "memory is stored in the brain much like in a computer, that is, each remembrance goes in a tiny piece of the brain." 82% of them disagreed, with 12% saying they did not know. I can understand why so few neuroscientists would have agreed with such a statement. If a neuroscientist claims that each memory is stored in one tiny spot of the brain, this raises the problem of how a brain could be able to instantly read from just the right tiny spot when an instantaneous recollection occurs. For example, if I suddenly hear the phrase "death of Abraham Lincoln" and instantly remember "assassination by John Wilkes Booth at Ford's Theater, April 14, 1965," how was I able to find the exact tiny spot where that information was stored, in a brain without any coordinate system or indexing system or position notation system?

Neuroscientists try to get around this problem by imagining that a memory is stored in not just one tiny spot in the brain but multiple spots in the brain. Unfortunately, this does not make things better for the theory that we retrieve memories from brains; it makes things worse. If, for example, my memory of

September 2018 (1)
August 2018 (1)
July 2018 (1)
June 2018 (1)
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Labels

- "brain as computer" metaphor
- academia dysfunction
- adult neurogenesis
- AI
- binary memory storage theory
- brain changes with age
- brain connectivity
- brain effect on personality
- brain imaging
- brain injury
- brain research projects
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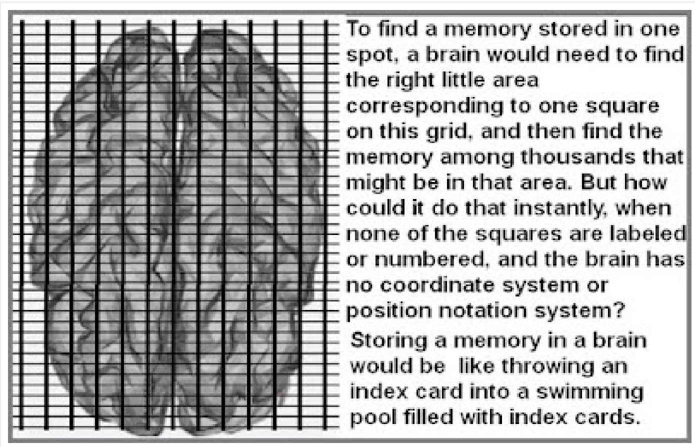
- EEG studies
- emergence
- epilepsy
- ESP
- evolution
- exceptional memory
- exceptional speed of thinking
- file drawer effect
- fraud
- free will
- genes
- global workspace theory
- groupthink
- health hazards in neuroscience experiments
- hemispherectomy
- high mental function despite large brain damage

how Abraham Lincoln died was scattered among several different tiny spots in the brain, then my instant retrieval of that memory from a brain without any coordinate system or addressing system or indexing system would be even more inexplicable than if I were to get the information all from a single spot. I would now have the additional difficulty of explaining how this spatially scattered information was all instantly retrieved from just the right places and also pieced together to make a single seamless integrated memory. No neuroscientist has even given a credible explanation of instant memory recall, and the only credible explanation of such a thing would one abandoning the notion of a neural storage of memories. We do not recall at the speed of brains; we recall at the speed of souls.



at February 12, 2022 No comments:

Friday, February 4, 2022

Why ESP Discredits the "Brains Make Minds" Claim

The evidence for ESP is overwhelming. You can read about some of that evidence by reading my posts below:

- The post here discusses abundant ESP evidence gathered by Soviet scientists, including evidence of "telepathic knockouts," in which a person could be made unconscious at the command of a distant person, who might be as much as a thousand miles away.
- The post here discusses a New York Times article reporting how a court case was won by an amazing demonstration of telepathy by the person who had been arrested.
- The post here discusses many impressive feats of telepathy, including several very dramatic cases witnessed and documented by a physician.
- The post here discusses cases of people very noticeably feeling a strange worry or distress at the time of a distant disaster involving one of their friends or loved ones.
- The post here discusses a phenomenon of eyeless sight abundantly documented by an early twentieth century observer (and corroborated by many subsequent observations).
- The post here discusses many cases of dramatic ESP performed by hypnotized subjects.
- The post here describes an extremely well-documented subject performing ESP, the blind or nearly-blind invalid Mollie Fancher

who while blindfolded passed endless tests of paranormal perception, and who routinely would correctly describe unseen visitors arriving at her door, outside of her field of view.

- The post here discusses abundant evidence of ESP gathered by a chemistry professor at a very prestigious university.
- The post here discusses compelling evidence of ESP gathered by a doctor.
- The post here discusses a summary of compelling experimental evidence for ESP, published on the mainstream Cornell physics paper server. For example, a summary of ESP tests using the ganzfeld protocol reveals that that over 46 years of tests, there were 4841 trials, producing 1520 successes, a hit rate of 31.5%, far over the expected-by-chance hit rate of 25%.
- The post here describes astonishing ESP results produced by the blind or nearly-blind Loraina Brackett.
- The post here describes extremely dramatic ESP results produced by a Mrs. Morel studied by Eugene Osty.
- The post here discusses extremely dramatic ESP results listed in a government document.
- The post here discusses some dramatic cases of clairvoyance.
- The post here discusses the very well-documented case of Alexis Didier, who demonstrated clairvoyance countless times in public exhibitions.
- The post here discusses a six-year investigation of the French Royal Academy of medicine, one which resoundingly found in favor of the reality of clairvoyance.
- The post here discusses dramatic evidence for spontaneous ESP gathered in abundance by Louisa Rhine.
- Similar accounts (including a very dramatic one from my own experience) are provided in this post and in this post.
- Dramatic evidence for ESP from the nineteenth century is discussed in this post and this post this post.
- Some dramatic experimental results in favor of ESP are discussed here, along with computer experiments shedding light on the vast improbability of their occurrence by chance.
- Compelling experimental results in favor of ESP are discussed here.
- The dramatic success of remote viewing experiments long funded by the US government is discussed here.
- Some dramatic accounts of ESP that I can personally testify to are included in my account here.
- An enormously successful remote ESP test (with two persons in different locations) is described in this post. Guessing 1850 cards selected by chance by a professor at a remote location, a woman guessed an average of 18.24 cards correctly per 25 cards, achieving a phenomenal 73% accuracy rate (instead of the expected accuracy rate of 20%). We would never expect to get a result this good by chance if every person on a billion trillion inhabited planets was to be given such a test.
- The enormously convincing experimental results produced by Joseph Rhine (particularly when testing with Hubert Pearce) are

discussed here.

- Very powerful evidence for ESP in autistic subjects is discussed here.
- 21st-century evidence for ESP is discussed here.

I have had experiences like this

Let us consider the question: is it possible to explain ESP by any hypothesis preserving the idea that brains generate minds? One possibility sometimes mentioned is the idea that ESP occurs when some kind of unknown radiation or wave travels from one brain to another.

In the book *The Personality of Man* by G. N. M. Tryrrell we have a good explanation of why such a hypothesis does not work. To understand the explanation fully, you need to understand what is called the inverse square law. This is a law that applies to known types of radiation such as light and radio waves. According to this law the strength of any radiation decreases by a factor of 4 whenever the distance between two objects is doubled. So, for example, if you are 10 million kilometers from the sun, your spaceship will get a certain amount of radiation energy from the sun; but if you move your spaceship so that it is 20 million kilometers from the sun, your spaceship will get one quarter of that radiation.

Tyrrell states this:

"(1) In the first place, any such physical radiation would have to be generated by a material transmitter of some kind, which would presumably be located in the brain or body of the agent. Since telepathy is known to take place over long distances, such a transmitter would have to be powerful enough to send a message over some thousands of miles. It could scarcely, therefore, be of microscopic dimensions. No such transmitter has ever been found in any human brain or body. A corresponding receiver would also have to exist in the body of the percipient B. ; and that has never been discovered either. (2) All known physical radiation obeys the inverse square law connecting intensity with distance. There is no evidence that telepathy obeys this law. If it did, a person who could transmit a telepathic message across the ocean would produce an enormously more powerful effect across a table. This kind of thing has never been observed. (3) Physicists possess a variety of sensitive instruments for detecting different kinds of radiation; yet they have never detected telepathic radiation, which, if it were physical, would be unlikely to have escaped them.

These are all very good objections that are rather perfectly stated. Item 4 on Tyrrell's list moves toward a very weighty objection, although he states it imperfectly. He states this:

(4) A much more serious objection, however, lies in the fact that in order to transmit ideas by any physical means whatever, use has to be made of a pre-arranged code. Unless such a code exists and is understood by both parties beforehand, no information can be transmitted by physical means. Spoken language is a code; written language is another. Unless the person spoken to or written to understands the language, he can receive no information. Even gestures and facial expressions are a code. Every code requires to be consciously applied and consciously interpreted; so that a physical theory of telepathy necessitates not only the existence of material transmitters and receivers but a conscious agent at each end to operate them and to code and decode the messages. Systems of dots and dashes, or audible words spoken into a microphone are, of course, the usual ways of encoding telegraphic, telephonic and radio messages. It would be utterly absurd to suppose that some unseen demon within us speaks words aloud into a telepathic transmitter situated in our brain or elsewhere in our body; yet without some such supposition a physical theory of telepathy will not work."

The point that Tyrrell is getting at is a good one: that information can only be sent long distance through some biological process or physical process if the information is encoded according to some coding system, and the same system is used by the transmitter and the receiver. For example, you can read information on the web only because both the publisher of the information (the web site you are on) and the receiver of the information (your web browser) are using exactly the same encoding protocols, which include things such as the ASCII protocol and the HTML protocol. We now know (contrary to what Tyrrell states) that there does not need to be "a conscious agent at each end," but there at least has to be at least a software or machinery or biology on both the transmitting and receiving ends, and both have to use the same protocol for successful communication to occur. Such a requirement is just another reason why the idea of brain-to-brain ESP communication is untenable. There would have to be some secret undiscovered brain biology by which thoughts were encoded for long-distance transmission, and also some secret undiscovered brain biology by which a brain could decode encoded thoughts that had been transmitted by some undiscovered form of radiation.

The overall requirements for brain-to-brain ESP would be something like this:

(1) Some undiscovered system in the brain capable of encoding thoughts for long-distance ESP transmission.

(2) Some undiscovered antenna-like system in the brain capable of transmitting such encoded thoughts over vast distances.

(3) Some undiscovered form of radiation (never detected by physicists) by which thoughts can be transmitted long-distance from brain to brain, apparently without any inverse-square kind of signal diminution with distance (unlike light and radio signals).

(4) Some undiscovered reception system in the brain capable of receiving such ESP thought signals (very hard to imagine, as a human body has nothing like an antenna for receiving signals).

(5) Some undiscovered decoding system in the brain capable of decoding such encoded ESP thought signals, and causing them to produce corresponding ideas in the mind of the receiver.

This list of requirements is so great and so far-fetched that it is clear that the idea of ESP being a brain-to-brain communication by means of radiation is one that must be rejected.

There is a good reason why materialists tell us the lie that there is not good evidence for ESP. They tell us this lie because it is one of quite a few lies that they very much need to tell. The existence of ESP is sufficient by itself to discredit all claims that human minds are merely the product of the brain.

Just after describing an astonishingly exact account of telepathy (pages 23-25), Arthur W. Osborn states this in his very interesting book on precognition entitled *The Future Is Now*:

"Many volumes have been filled with accounts of spontaneous telepathy and clairvoyance. As I have pointed out elsewhere, these facts destroy all mechanistic attempts to explain consciousness as being merely a product of neural functioning. If it is assumed that all our knowledge is derived only by means of the senses, then how can we know of events entirely beyond the reach of the senses?... Both spontaneous and experimental cases of paranormal cognition demonstrate that certain people do become aware of thoughts in other minds and of events at a distance under conditions of rigorous control which exclude the possibility of fraud and where it is impossible for any physical means of communication to operate....Clairvoyance and telepathy do indeed pose crucial problems for the classical theories of mind; and for those theories which postulate that consciousness is exclusively dependent on the physical organism they administer a coup de grace."

A *coup de grace* is a final blow given to a wounded person or animal to cause its death.

In the quotes above, Tyrrell takes a wise approach. His approach is to start listing all of the things that would have to exist if brain-to-brain ESP was occurring. We should use the same approach when discussing other things attributed to the brain, such as memory formation and memory recall.

Here is a list of the things that would have to exist in the brain for humans to be storing memories in the brain:

(1) Some system by which learned knowledge and human experiences are converted or encoded into neural states. This is the most horrendous problem for anyone claiming brains store memories. You can't just "write learned knowledge" or "write experience" to a brain as effortlessly as one would pour water into a cup. For knowledge or experience to be stored in a brain as neural states or synapse states, there would have to be some super-elaborate coding system capable of handling all of the countless different ways in which humans can acquire knowledge. The coding system would have to be some "miracle of design" infinitely more complicated than the Morse Code, for it would have to store so many types of things: images, smells, sounds, music and text. We can't imagine any such system capable of storing English text arising before the year 1000 BC, because the English language and the English alphabet did not exist then. So we would have to imagine this enormously elaborate encoding system arising in only

the past few thousand years, contrary to the claims of Darwinists that evolution works slowly.

(2) This encoding system would have to work enormously fast, to cover cases of instantaneous memory formation which routinely occur.

(3) There would have to be some kind of write mechanism that would allow this encoded information to be stored in the brain as neural states or synapse states.

(4) There would have to be some capability allowing this written information to be preserved for decades, despite all of the rapid structural turnover and rapid molecular turnover that occurs in the brain. Proteins in the brain have an average lifetime of less than two weeks, and dendritic spines and synapses do not last for years.

(5) There would have to be some capability allowing a memory to be instantly found. So, for example, if you hear the name "Richard Nixon' and then instantly remember "US president elected in 1968 who resigned in 1974," there would have to be some neural mechanism by which you could instantly find a brain's stored information about Richard Nixon upon you hearing his name.

(6) There would have to be some read capability by which a memory was read from some location in the brain where it was stored.

(7) There would have to be some decoding capability by which this encoded information existing as neural states or synapse states was translated into conceptual information allowing the mind to experience a recollection.

Just as there exists no evidence of the things mentioned by Tyrrell that would have to exist for brains to be responsible for ESP, there exists no evidence of the things mentioned above that would have to exist for brains to be responsible for memory storage and memory retrieval. Specifically:

(1) Scientists have found no evidence of any encoding system by which a brain can translate learned knowledge or episodic experience into stored knowledge existing as neural states or synapse states. If such a system existed, it would have to have a large footprint in the genome, involving very many proteins dedicated to achieving such encoding; but no good evidence for such a thing has been found.

(2) There is no evidence of any write capability in a brain that can store encoded information.

(3) No one has found any mechanism allowing a preservation over decades of memories stored in synapses or dendritic spines with such a high level of structural turnover and molecular turnover.

(4) No one has found any mechanism in a brain that can explain the instant retrieval of memories. The brain has nothing like the type of things that would be required for such instant retrieval to work, things such as indexing or a coordinate system or a position notation system. So finding a memory stored in a brain would as slow as finding

someone's house in New York City (at an unknown location in the city) if New York City had no street names and no house numbers.

(5) No one has found any read capability in a brain that could read encoded learned information. A computer hard disk has a movable read-write head to write and read information from some particular spot on the disk, but nothing like that exists in the brain. The brain has nothing like the cursor that exists in a word processor program, something that keeps track of the current reading or writing position.

(6) The brain has nothing like some decoding system that would allow learned information or episodic experience encoded in neural states or synapse states to be translated into a recollection occurring in the mind.

Just as we must say that the brain is totally unsuitable for the job of extrasensory perception, we must say that the brain is totally unsuitable for the common chores of memory storage and memory retrieval.

at February 04, 2022 No comments:

Labels: ESP

Friday, January 28, 2022

List of Breakthrough Prize Winners in Life Sciences Hints at the Lack of Progress in Cognitive Neuroscience

The Breakthrough Prize in Life Sciences is a 3-million dollar prize given for advances in biology. The prize was founded by 2013 after donations by high-tech billionaires such as Mark Zuckerberg. Let's take a look at a list of all the Breakthrough Prize in Life Sciences that have been awarded since 2013, quoting from the wikipedia.org page that lists them:

- "for the genetics of neural circuits and behavior, and synaptic guidepost molecules"
- "for linkage mapping of Mendelian disease in humans using DNA polymorphisms"
- "for the discovery of PI 3-Kinase and its role in cancer metabolism"
- "for describing the role of Wnt signaling in tissue stem cells and cancer"
- "for research on telomeres, illuminating how they protect chromosome ends and their role in genome instability in cancer"
- "for discoveries in the mechanisms of angiogenesis that led to therapies for cancer and eye diseases"
- "for the discovery of general principles for identifying human disease genes, and enabling their application to medicine through the creation and analysis of genetic, physical and sequence maps of the human genome"
- "for cancer genes and targeted therapy"
- "for characterization of human cancer genes"
- "for induced pluripotent stem cells"
- "for cancer genomics and tumor suppressor genes"
- "for the discovery of T cell checkpoint blockade as effective cancer therapy"

- "for defining the interlocking circuits in the brain that malfunction in Parkinson's disease – this scientific foundation underlies the circuit-based treatment of Parkinson's disease by deep brain stimulation"
- "for the discovery of Target of Rapamycin (TOR) and its role in cell growth control"
- "for discoveries leading to the development of controlled drug-release systems and new biomaterials"
- "for the discovery of genes and biochemical mechanisms that cause hypertension"
- "for discovering critical molecular determinants and biological functions of intracellular protein degradation"
- "for the discovery and pioneering work on the development of high-frequency deep brain stimulation (DBS), which has revolutionized the treatment of Parkinson's disease"
- "for the discovery of covalent modifications of histone proteins and their critical roles in the regulation of gene expression and chromatin organization, advancing the understanding of diseases ranging from birth defects to cancer"
- "for the discovery of a new world of genetic regulation by microRNAs, a class of tiny RNA molecules that inhibit translation or destabilize complementary mRNA targets"
- "for harnessing an ancient mechanism of bacterial immunity into a powerful and general technology for editing genomes, with wide-ranging implications across biology and medicine"
- "for the development and implementation of optogenetics – the programming of neurons to express light-activated ion channels and pumps, so that their electrical activity can be controlled by light"
- "for discovering mutations in the amyloid precursor protein (APP) gene that cause early onset Alzheimer's disease, linking accumulation of APP-derived beta-amyloid peptide to Alzheimer's pathogenesis and inspiring new strategies for disease prevention"
- "for the discovery of human genetic variants that alter the levels and distribution of cholesterol and other lipids, inspiring new approaches to the prevention of cardiovascular and liver disease"
- "for pioneering the sequencing of ancient DNA and ancient genomes, thereby illuminating the origins of modern humans, our relationships to extinct relatives such as Neanderthals, and the evolution of human populations and traits"
- "for elucidating how eukaryotic cells sense and respond to damage in their DNA and providing insights into the development and treatment of cancer"
- "for discovering the centrality of RNA in forming the active centers of the ribosome, the fundamental machinery of protein synthesis in all cells, thereby connecting modern biology to the origin of life and also explaining how many natural antibiotics disrupt protein synthesis"
- "for pioneering research on the Wnt pathway, one of the crucial intercellular signaling systems in development, cancer and stem cell biology"

- "for elucidating autophagy, the recycling system that cells use to generate nutrients from their own inessential or damaged components"
- "for discoveries of the genetic causes and biochemical mechanisms of spinocerebellar ataxia and Rett syndrome, findings that have provided insight into the pathogenesis of neurodegenerative and neurological diseases"
- "for discovering how plants optimize their growth, development, and cellular structure to transform sunlight into chemical energy"
- "for elucidating the unfolded protein response, a cellular quality-control system that detects disease-causing unfolded proteins and directs cells to take corrective measures"
- "for elucidating the sophisticated mechanism that mediates the perilous separation of duplicated chromosomes during cell division and thereby prevents genetic diseases such as cancer"
- "for elucidating the molecular pathogenesis of a type of inherited ALS, including the role of glia in neurodegeneration, and for establishing antisense oligonucleotide therapy in animal models of ALS and Huntington disease"
- "for the development of an effective antisense oligonucleotide therapy for children with the neurodegenerative disease spinal muscular atrophy"
- "for determining the consequences of aneuploidy, an abnormal chromosome number resulting from chromosome mis-segregation"
- for discovering hidden structures in cells by developing super-resolution imaging – a method that transcends the fundamental spatial resolution limit of light microscopy"
- "for elucidating how DNA triggers immune and autoimmune responses from the interior of a cell through the discovery of the DNA-sensing enzyme cGAS"
- "for the discovery of a new endocrine system through which adipose tissue signals the brain to regulate food intake"
- "for discovering functions of molecular chaperones in mediating protein folding and preventing protein aggregation"
- "for discovering molecules, cells, and mechanisms underlying pain sensation"
- "for discovering TDP43 protein aggregates in frontotemporal dementia and amyotrophic lateral sclerosis, and revealing that different forms of alpha-synuclein, in different cell types, underlie Parkinson’s disease and Multiple System Atrophy"
- "for developing technology that allowed the design of proteins never seen before in nature, including novel proteins that have the potential for therapeutic intervention in human diseases"
- "for deconstructing the complex behavior of parenting to the level of cell-types and their wiring, and demonstrating that the neural circuits governing both male and female-specific parenting behaviors are present in both sexes"
- "for discovering that fetal DNA is present in maternal blood and can be used for the prenatal testing of trisomy 21 and other genetic disorders"

- "for elucidating a quality control pathway that clears damaged mitochondria and thereby protects against Parkinson's Disease"
- "for elucidating the molecular basis of neurodegenerative and cardiac transthyretin diseases, and for developing tafamidis, a drug that slows their progression"
- "for engineering modified RNA technology which enabled rapid development of effective COVID-19 vaccines"
- "for the development of a robust and affordable method to determine DNA sequences on a massive scale, which has transformed the practice of science and medicine"

In the list above there is a lack of any breakthroughs from the area of cognitive neuroscience, with the possible exception of the one line referring to parenting behaviors. We hear no mention of the words "memory" or "consciousness" or "cognition" or "learning" or "understanding" or "thinking."

Let's look at the only line above referring to something from cognitive neuroscience: the line that makes a misleadingly broad reference to someone "demonstrating that the neural circuits governing both male and female-specific parenting behaviors are present in both sexes." No one has actually shown that neural circuits govern any type of behavior in any organism. The line is referring to a 2021 award to Catherine Dulac. If we look at the corresponding paper she co-authored ("Galanin neurons in the medial preoptic area govern parental behavior"), we will find nothing very impressive. It is an experimental paper merely dealing with an extremely narrow topic: mice and their behavior when presented with never-before-seen baby mice (called mice pups). The paper claims to have altered behavior of mice when presented with unfamiliar mice pups, by altering the brains of the mice.

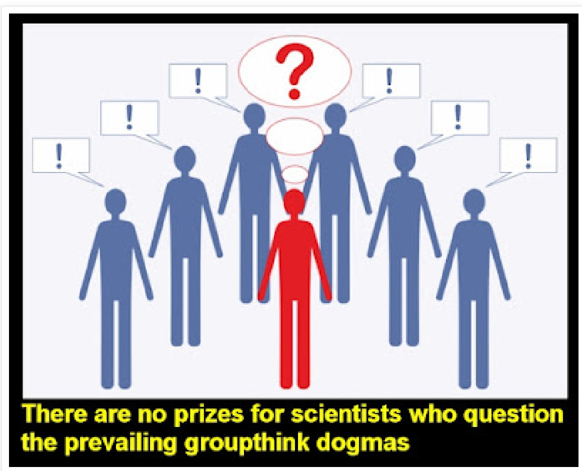
Unfortunately, the paper fails to be a robust demonstration, because it often uses study group sizes smaller than 15, as small as only 8. 15 subjects per study group is the minimum needed for a robust experimental demonstration. Also the paper fails to discuss how a serious blinding protocol was implemented, merely mentioning two cases in which an observer was blind to something, rather than mentioning in detail how a thorough blinding protocol was implemented. In the "Statistics" part of the paper the authors confess their failure to do a sample size calculation, which is a calculation done to make sure that adequate sample sizes were used. They state, "The sample sizes in our study were chosen based on common practice in animal behavior experiments." That is the kind of thing that people state when they failed to calculate the sample sizes needed for a robust result. It is well known that these days neuroscience experimenters are habitually failing to use adequate sample sizes, with such a failure being more the rule than the exception, as discussed in the widely cited paper "Power failure: why small sample size undermines the reliability of neuroscience." So when a paper says "the sample sizes in our study were chosen based on common practice in animal behavior experiments," we should treat that as a confession that a poor practice was followed.

So the only claimed "breakthrough" in the field of cognitive neuroscience turns out to be a "small potatoes" affair, something that did not follow experimental best practices, and does not qualify at all as a breakthrough.

The list above is a kind of Exhibit A that I can cite to back up my claim that no progress has been made in supporting neruoscientist dogmas that brains store memories or that brains are the source of human minds. In the past decade hundreds of millions of dollars have been doled out to our cognitive neuroscientists, but they have had no success in substantiating the claims they keep making about brains storing memories and brains producing minds.

The list above also suggests two other things:

- No major progress is being made by biologists in understanding the origin of life. The only reference to the origin of life in the list above is a superfluous and unwarranted claim that a discovery about "the centrality of RNA in forming the active centers of the ribosome" has accomplished some feat of "connecting modern biology to the origin of life," a vague and vacuous phrase that does not really mean much of anything.
- No major progress is being made by scientists in understanding morphogenesis, how the enormously organized state of a full human body is able to gradually arise from the million-times-simpler state of a speck-sized egg. The list above mentions no progress in the field of developmental biology.



A lack of progress in cognitive neuroscience is suggested by the quote below from a recent neuroscience paper:

"Neuroscience is at the stage biology was at before Darwin. It has a myriad of detailed observations but no single theory explaining the connections between all of those observations. We do not even know if such a brain theory should be at the molecular level or at the level of brain regions, or at any scale between."

at January 28, 2022 No comments:

Wednesday, January 19, 2022

Integrated Information Theory's Tangled Metaphysics Does Nothing to Explain Consciousness

A theory called "integrated information theory" purports to be a theory of consciousness. We should always be suspicious of any theory claiming to be a "theory of consciousness." "Consciousness" is the most reductive term you could use to describe human minds and human mental experience. A person trying to explain a human mind by advancing what he calls a "theory of consciousness" is rather like a person trying to explain planet Earth by advancing what he calls a "theory of roundness." Just as roundness is only one aspect of planet Earth, consciousness is only one aspect of the human mind and human mental experience. What we need is not a "theory of consciousness" but something very much harder to create: a theory of mentality that includes all of the main aspects of human mentality (including consciousness, comprehension, thinking, memory, imagination and creativity).

When I go a website devoted to selling integrated information theory (www.integratedinformationtheory.org), I get a home page that has at its first link a link to a paper behind a paywall. But the second link is to a paper that anyone can read. Let's take a close look at that paper, entitled, "From the Phenomenology to the Mechanisms of Consciousness: Integrated Information Theory 3.0," and authored by Masafumi Oizumi, Larissa Albantakis, and Giulio Tononi .

The abstract of the paper should leave us very discouraged about integrated information theory:

"This paper presents Integrated Information Theory (IIT) of consciousness 3.0, which incorporates several advances over previous formulations. IIT starts from phenomenological axioms: information says that each experience is specific – it is what it is by how it differs from alternative experiences; integration says that it is unified – irreducible to non-interdependent components; exclusion says that it has unique borders and a particular spatio-temporal grain. These axioms are formalized into postulates that prescribe how physical mechanisms, such as neurons or logic gates, must be configured to generate experience (phenomenology). The postulates are used to define intrinsic information as 'differences that make a difference' within a system, and integrated information as information specified by a whole that cannot be reduced to that specified by its parts. By applying the postulates both at the level of individual mechanisms and at the level of systems of mechanisms, IIT arrives at an identity: an experience is a maximally irreducible conceptual structure (MICS, a constellation of concepts in qualia space), and the set of elements that generates it constitutes a complex. According to IIT, a MICS specifies the quality of an experience and integrated information Φ^{Max} *its quantity. From the theory follow several results, including: a system of mechanisms may condense into a major complex and non-overlapping minor complexes; the concepts that specify the quality of an experience are always about the complex itself and relate only indirectly to the external environment; anatomical connectivity influences complexes and associated MICS; a complex can generate a MICS even if its elements are inactive; simple systems can be minimally conscious; complicated systems can be unconscious; there can be true 'zombies' – unconscious feed-forward systems that are functionally equivalent to conscious complexes."*

We have heard in this abstract no sign that any compelling reasoning will appear in the paper. To the contrary, we have got two signals that the paper will be pushing nonsense. The first signal is the absurd insinuation that logic gates (a low-level building block of a digital system) can be somehow configured to generate conscious experience. The second signal is the claim that "simple systems can be minimally conscious." There are minimally conscious organisms on our planet, but none of them are simple systems. When we consider all of the complexity of its cells, each as complex as a factory, we should realize that even the simplest maybe-barely-conscious ant is not at all a simple system.

After the paper asks a bunch of questions, in the section entitled "Models" we read this: "The main tenets of IIT can be presented as a set of phenomenological axioms, ontological postulates, and identities." That sounds like metaphysics, not anything like a scientific theory.

After the paper defines an "axiom" as a self-evident truth, we read some "axiom" defined by the paper. One of these "axioms" is listed as follows:

"*COMPOSITION: Consciousness is compositional (structured): each experience consists of multiple aspects in various combinations. Within the same experience, one can see, for example, left and right, red and blue, a triangle and a square, a red triangle on the left, a blue square on the right, and so on."*

It is not true that "each experience consists of multiple aspects in various combinations," although many experiences do consist of such a thing. A person can have a simple experience consisting of a single aspect. For example, you may lie on a beach looking up at a clear blue sky, while thinking of nothing. Such consciousness has only one aspect: your perception of the blueness above you. Similarly, while waiting to fall asleep at night with your eyes closed, you may perceive nothing and be thinking of nothing. Such an experience does not consist of "multiple aspects in various combinations."

We then read this "axiom":

"INFORMATION: Consciousness is informative: each experience differs in its particular way from other possible experiences. Thus, an experience of pure darkness is what it is by differing, in its particular way, from an immense number of other possible experiences. A small subset of these possible experiences includes, for example, all the frames of all possible movies."

No, it is not correct that "consciousness is informative." Something is informative if it supplies information. Consciousness by itself does not supply information. A conscious person may or not be involved in supplying information.

We then read this "axiom":

"INTEGRATION: Consciousness is integrated: each experience is (strongly) irreducible to non-interdependent components. Thus, experiencing the word 'SONO' written in the middle of a blank page is irreducible to an experience of the word 'SO' at the right border of a half-page, plus an experience of the word 'NO' on the left border of another half page – the experience is whole. Similarly, seeing a red triangle is irreducible to seeing a triangle but no red color, plus a red patch but no triangle."

The word "integrated" means "with various parts or aspects linked or coordinated." The human mind may be thought of as being integrated (for example, consciousness is linked with memory and understanding). But mere consciousness is not intrinsically integrated. At some moment I may be aware of the blue sky ahead of me, but such awareness does not consist of multiple parts. An experience does not have to consist of multiple parts. As for the logic about "SONO" written on a blank page, of course that is "irreducible to an experience of the word 'SO' at the right border of a half-page, plus an experience of the word 'NO' on the left border of another half page," because that would give you "NOSO" not "SONO."

So we have a very shaky foundation. We have three supposedly "self-evident axioms" that are not actually self-evident at all. Next we have a section called "Mechanisms" that suddenly starts dogmatizing about three characteristics that would be possessed by a "mechanism that can contribute to consciousness." The results sounds like extremely dubious metaphysics. No foundation has been laid establishing that there can be any such thing as a "mechanism that can contribute to consciousness."

To the contrary, we can imagine no physical "mechanism that can contribute to consciousness." Consciousness is an immaterial thing, and mechanisms are material things. We can get no plausible idea of how it can be that material things or material mechanisms could "contribute to consciousness." If I have one neuron existing by itself, there is no reason why such a neuron should "contribute to consciousness." If I have 100 billion neurons that are all connected, there is no reason why such an arrangement should "contribute to consciousness." If we think that connected neurons should somehow give rise to consciousness, that is only because we have been brainwashed into thinking such a thing by endless repetitions of such a groundless claim. Similarly, if we had been endlessly told all our lives that consciousness was caused by electron collisions, then we might think that some glass jar with lots of colliding electrons would produce a conscious mind.

We then have in the paper (under a title of "Systems of Mechanisms") three paragraphs making dogmatic claims such as the claim that "a set of elements can be conscious only if its mechanisms specify a conceptual structure that is *irreducible* to non-interdependent components (strong integration)." We are deeply mired now in arbitrary metaphysics, as we would be if we were reading a work of G.W. Hegel. Nothing has been done to show that "a set of elements can be conscious," so the writers have no business making such claims. Organisms are not correctly described as "a set of elements."

A little later in Box 1 of the paper we have a glossary, which defines more than thirty terms that will be used in the paper. The glossary is very dense metaphysical gobbeldygook. An example is the term "cause-effect repertoire" which is defined with this gibberish definition: "The probability distribution of potential past and future states of a system as constrained by a mechanism in its current state."

The paper then has a whole bunch of strange diagrams that have many circles, circles within circles, diagram, arrows pointing from one circle to another, and so forth. None of this does anything to clarify how humans have consciousness.

Below (in italics) are some of the dubious metaphysical claims we read in the paper:

- "*Recall that IIT's information postulate is based on the intuition that, for something to exist, it must make a difference. By extension, something exists all the more, the more of a difference it makes."* No, it is not true that for something to exist, it must make a difference. Dust clouds in interstellar space exist, and rocks in the center of distant planets exist, without making any difference. And something does not exist "all the more" depending on the difference it makes. A person with no influence on the world exists just as much as some influential person.

- "*The integration postulate further requires that, for a whole to exist, it must make a difference above and beyond its partition, i.e. it must be irreducible."* No, a whole does not have to be irreducible. A whole consisting of three people can be reduced to three individuals, and a molecule consisting of five atoms can be broken up and reduced to its individual atoms.
- "*Complexes cannot overlap and at each point in time, an element/mechanism can belong to one complex only.*" No, complexes can overlap; for example, the brain complex overlaps with the circulatory system in the body. And an element can belong to more than one complex. A blood vessel in the brain belongs to both the brain system and the circulatory system.
- *"The exclusion postulate at the level of systems of mechanisms says that only a conceptual structure that is* maximally *irreducible can give rise to consciousness – other constellations generated by overlapping elements are excluded*." Since humans have no understanding at all of how any structure can give rise to consciousness, it is unwarranted to be making some claim with the form "only X can give rise to consciousness." Describing such a claim as a postulate (an assumption) indicates its weakness.
- "*The exclusion postulate requires, first, that only one cause exists. This requirement represents a causal version of Occam's razor, saying in essence that 'causes should not be multiplied beyond necessity', i.e. that causal superposition is not allowed.*" Occam's razor is not the principle that something cannot have multiple causes. It is the principle that in general we should prefer a simpler explanation that requires postulating fewer things in order to explain something. Many things do have multiple causes, and it is dead wrong to claim that causal superposition (assuming multiple causes of a single effect) is not allowed. Very many things do have multiple causes.
- *"Simple systems can be conscious: a minimally conscious photodiode."* This is a followed by text claiming that a tiny unit called a photodiode is minimally conscious. Since a modern digital camera contains very many such photodiodes (one for each pixel captured), integrated information theory would seem to predict that every digital camera is substantially conscious -- an idea that is extremely nonsensical.

No, this is not conscious

Later in the article we have an inaccurate appeal to one of the phoniest myths of neuroscientists: the claim that split brain patients have two different minds. We read this:

"Under special circumstances, such as after split brain surgery, the main complex may split into two main complexes, both having high ΦMax. There is solid evidence that in such cases consciousness itself splits in two individual consciousnesses that are unaware of each other."

No such evidence exists. A similar bogus claim is made in another article on integrated information theory appearing on the www.integratedinformation.org site (one authored by Giulio Tononi, one of the three authors mentioned above): "It is well established that, after the complete section of the corpus callosum—the roughly 200 million fibers that connect the cortices of the two hemispheres—consciousness is split in two: there are two separate 'flows' of experience, one associated with the left hemisphere and one with the right hemispheres." That claim is untrue. To the contrary, in 2014 the wikipedia.org article on split-brain patients stated the following:

"In general, split-brained patients behave in a coordinated, purposeful and consistent manner, despite the independent, parallel, usually different and occasionally conflicting processing of the same information from the environment by the two disconnected hemispheres...Often, split-brained patients are indistinguishable from normal adults."

In the video here we see a split-brain patient who seems like a pretty normal person, not at all someone with "two minds." And at the beginning of the video here the same patient says that after such a split-brain operation "you don't notice it" and that you don't feel any different than you did before – hardly what someone would say if the operation had produced "two minds" in someone. And the video here about a person with a split brain from birth shows us what is clearly someone with one mind, not two.

A scientific study published in 2017 set the record straight on split-brain patients. The research was done at the University of Amsterdam by Yair Pinto. A press release entitled "Split Brain Does Not Lead to Split Consciousness" stated, "The researchers behind the study, led by UvA psychologist Yair Pinto, have found strong evidence showing that despite being characterised by little to no communication between the right and left brain hemispheres, split brain does not cause two independent conscious perceivers in one brain."

The press release states the following: “According to Pinto, the results present clear evidence for unity of consciousness in split-brain patients.”

The paper states, “These findings suggest that severing the cortical connections between hemispheres splits visual perception, but does not create two independent conscious perceivers within one brain.” The recent article here in Psychology Today describes the bizarre experiment that was used to make the groundless claim that split-brain patients have two minds. It was some experiment based only on visual perception, using some strange experimental setup unlike anyone normally encounters. The article shreds to pieces claims that results from such an experiment show that split-brain patients have two minds:

"Not so fast. There are several reasons to question the conclusions Sperry, Gazzaniga, and others sought to draw. First, both split-brain patients and people closest to them report that no major changes in the person have occurred after the surgery. When you communicate with the patient, you never get the sense that the there are now different people living in the patient's head.

This would be very puzzling if the mind was really split. Currently, you are the only conscious person in your neocortex. You consciously perceive your entire visual field, and you control your whole body. However, if your mind splits, this would dramatically change. You would become two people: 'lefty' and 'righty.' 'Lefty' would only see what is in the right visual field and control the right side of the body while 'righty' would see what’s in the left visual field and control the left side of the body. Both 'lefty' and 'righty' would be half-blind and half-paralyzed. It would seem to each of them that another person is in charge of half of the body.

Yet, patients never indicate that it feels as though someone else is controlling half of the body. The patients’ loved ones don’t report noticing a dramatic change in the person after the surgery either. Could we all — patients themselves, their family members, and neutral observers — miss the signs that a single person has been replaced by two people? If you suddenly lost control of half of your body, could you fail to notice? Could you fail to notice if the two halves of your spouse’s or child’s body are controlled by two different minds?"

A 2020 paper states this about split-brain patientis: " Apart from a number of anecdotal incidents in the subacute phase following the surgery, these patients seem to behave in a socially ordinary manner and they report feeling unchanged after the operation (Bogen, Fisher, & Vogel, 1965; Pinto et al., 2017a; R. W. Sperry, 1968; R. Sperry, 1984)." Misleading statements by neuroscientists are extremely common, and claims by some of them that normal-speaking and normal-acting split-brain patients have two minds (based merely on differing results produced in very weird artificial experimental setups not like real-world cases) is one of the most egregious examples of inaccurate speech by neuroscientists.

What we have in the "From the Phenomenology to the Mechanisms of Consciousness: Integrated Information Theory 3.0" paper is mainly metaphysics following the opague oracular style of Hegel and Heidegger, often careless and poorly reasoned metaphysics. The claim often made that integrated information theory is a "scientific theory of consciousness" is untrue. Integrated information theory is a very errant metaphysical theory that includes a few appeals to scientific observations, to give a little scientific flavor to its gibberish gobbledygook. The most important reference the theory makes to an alleged scientific observation is a bogus claim that splitting a brain by severing the corpus callosum produces two minds, something that has never actually been observed, with the actual observations telling us that no such thing occurs.

Besides inaccurately predicting that split-brain patients should have two minds, integrated information theory inaccurately predicts that "widespread lesions" of the cortex should cause unconsciousness. In the scholarpedia.org article on the theory, Giulio Tononi states this:

"IT provides a principled and parsimonious way to account for why certain brain regions appear to be essential for our consciousness while others do not. For example, widespread lesions of the cerebral cortex lead to loss of consciousness, and local lesions or stimulations of various cortical areas and tracts can affect its content (for example, the experience of color)."

To the contrary, it is a fact that many epileptic patients with severe seizures underwent hemispherectomy operations in which half of the brain (including half of the cortex) was removed, without any major effect on either consciousness or intelligence. Many of John's Lorber's patients with good intelligence and normal consciousness had lost most of their cortex. A French person who held a job as a civil servant was found to have "little more than a thin sheet of actual brain tissue." In the paper here we read on page 1 of a case reported by Martel in 1823 of a boy who after age five lost all of his senses except hearing, and became bed-confined. Until death he 'seemed mentally unimpaired.' But after he died, an autopsy was done which found that apart from “residues of meninges" there was "no trace of a brain" found inside the skull. This was good consciousness, with little or no cortex. In the same paper we read of a person who had a normal life despite having "very little cortex" because of hydrocephalus in which brain tissue is replaced by fluid:

"A man was examined because of his headache, and to his physicians' surprise, he had an 'incredibly large' hydrocephalus. Villinger, the director of the Cognitive Neurology Department, stated that this man had 'almost no

brain,' only 'a very thin layer of cortical tissue.' This man led an unremarkable life, and his hydrocephalus was only discovered by chance (Hasler, 2016, p. 18)"

at January 19, 2022 No comments:

Labels: integrated information theory, split-brain operation

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Head Truth

The huge case for thinking minds do not come from brains

Wednesday, January 12, 2022

No, a USC Team Did Not Show "How Memories Are Stored in the Brain"

The EurekAlert site at www.eurekalert.org is yet another "science news" site that seems to just pass on press releases coming from university press offices. Nowadays university press offices are not a very reliable source of information, as they tend to display all kinds of "local bias" in which the work of researchers at the university gets some adulatory treatment it does not deserve. University press offices often make grandiose claims about research done by professors at their university, fawning or hype-filled claims that are often unwarranted. The press releases from university press offices often make unimportant or dubious research sound as if it was some type of important breakthrough.

The EurekAlert site says that it is "a service of the American Association for the Advancement of Science." That makes it sound like we would be getting some kind of "official science news" or at least news of better-than-average reliability. But very strangely at the bottom of each news story on the site, we read this notice: "Disclaimer: AAAS and EurekAlert! are not responsible for the accuracy of news releases posted to EurekAlert! by contributing institutions or for the use of any information through the EurekAlert system." That basically means that we should not trust any headlines we read merely because they appear on the EurekAlert site. At the post here I discuss various untrue headlines that appeared on the EurekAlert site.

The latest untrue headline to appear at the EurekAlert site is a headline from two days ago, one which stated "USC team shows how memories are stored in the brain, with potential impact on conditions like PTSD." Nothing of the sort occurred. All that happened was that some scientists tracked some new synapses being created and an equal number of synapses being lost after some tiny zebrafish learned something.

We read text in the story that contradicts the story's headline:

"They made the groundbreaking discovery that learning causes synapses, the connections between neurons, to proliferate in some areas and disappear in others rather than merely changing their strength, as commonly thought. These changes in synapses may help explain how memories are formed and why certain kinds of memories are stronger than others."

Notice the contradiction. The headline claimed that the team had showed how memories are stored in the brain. But the text of the story merely makes the much weaker claim that the type of thing observed "may help explain how memories are formed."

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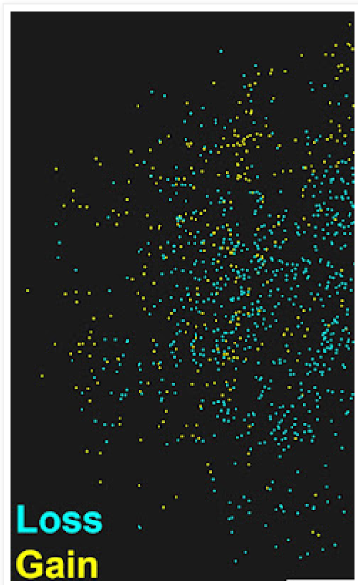
The quotation above is not even an accurate description of what was observed. The scientists did not find that synapses "proliferate in some areas and disappear in others." Instead what was observed in each area of the zebrafish brain studied was a roughly equal number of gains of synapses and losses of synapses. Below is one of the visuals from the paper (from the page here and the site here). It shows synapses losses and gains in only one tiny part of the zebrafishes brain during a small time period. Notice the blue dots (representing synapse losses) are roughly as common as the yellow dots (representing synapse gains).



Data results such as this are best interpreted under the hypothesis that we are merely seeing random losses and gains of synapses that continually occur, and that the result has nothing to do with anything being learned. It has long been known that synapses are short-lived things. The paper here states, "Experiments indicate in absence of activity average life times ranging from minutes for immature synapses to two months for mature ones with large weights." Synapses randomly appear and disappear, just as pimples randomly appear and disappear on the face of a teenager with a bad case of acne.

Zebrafish have only about 100,000 neurons, and there are perhaps 1000 synapses for every neuron. That makes very roughly about 100 million synapses in the zebrafish brain. Given synapses that have average lifetimes of no greater than a few months, we would expect that every hour about 100,000 synapses in the zebrafish brain would randomly be lost or would randomly appear. The synapse loss and gain shown in the USC data is about what we would expect under such numbers. The visual shows hundreds of synapse losses and gains, but this visual only maps such losses and gains in a tiny portion of the zebrafish brain.

The type of learning tested on the zebrafish was something called tail-flick conditioning or TFC. At the link here we are told this:

"The total numbers of synapses before TFC are not significantly different among the different groups: superlative learner (L, N=11 fish), partial learner (PL, N = 6), nonlearner (NL, N=11), US only (N=11), NS (N=11), and CS only (N=11) (p > 0.3, Kruskal Wallis).

- A Soul Might Explain Instincts, but DNA and Brains Cannot
- Five Hallmarks of an Information Storage System (None of Which Your Synapses Have)
- Your Physical Structure Did Not Arise Bottom-Up, So Why Think Your Mind Did?
- Why a "Mechanical Memory" Theory Does Not Work
- The Brain Seems to Have No Mechanism for Reading or Writing Memories
- No One Understands How a Brain Could Generate Ideas
- Prevailing Brain Dogmas Cannot Explain Hypnotic Phenomena
- 30 Reasons for Rejecting the Theory of Neural Memory Storage
- Common Experiences That Show the Untruth of Professorial Memory Claims
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- Groupthink and Peer Pressure Make It Taboo for Neuroscientists to Put Two and Two Together
- The Social Construction of Eager Community Mirages
- Preprint Server Counts Suggest Engrams Are Not Really Science
- Engrams Are Touted Like Phlogiston Was Once Touted
- Synaptic Delays Mean Brain Signals Must Move at a Snail's Pace
- Raven Smarts Defy Prevailing Brain Dogmas
- No One Can Credibly Explain Why a Brain Would Store a Memory in One Specific Spot
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- Vacillating Disarray of the Memory Trace Theorists
- Study Finds "Poor Overall Reliability" of Brain Scanning Studies
- "Brains Store Memories" Dogma Versus the Reality of Noisy Brains
- The Brain Has Nothing Like 7 Things a Computer Uses to Store and Retrieve Information

B The total numbers of synapses after TFC are not significantly different among the different groups (p > 0.3, Kruskal Wallis)."

So there was no increase in synapses for the zebrafish who learned something (the L and PL groups) compared to the zebrafish who did not learn anything (the NL group). The study has not produced any evidence that learning or memory formation produces an increase in synapses.

The study also failed to support the widely-made claim that synapses strengthen during memory formation or learning. In the EurekAlert story we read this:

" 'For the last 40 years the common wisdom was that you learn by changing the strength of the synapses,' said Kesselman, who also serves as director of the Informatics Division at the USC Information Sciences Institute and is a professor with the Daniel J. Epstein Department of Industrial and Systems Engineering, 'but that's not what we found in this case.' "

Oops, it sounds like neuroscientists have been telling us baloney for the past 40 years by trying to claim that memories are formed by synapse strengthening (an idea that never made any sense, because information is never stored by a mere strengthening of something). The USC scientists have not presented anything that can serve as a credible substitute narrative. "Synapses being lost at the same rate as synapses being gained" makes no sense as a narrative of how memories could be stored, just as "words being written at the same rate as words being erased" makes no sense as a description of how someone could write a book using pencil and paper.

By visually diagramming the high turnover rate of synapses, and by reminding us of the short lifetimes and rapid turnover of synapses, what the USC study really has done is to highlight a major reason for rejecting all claims that human memories are stored in synapses. Synapses only last for days, weeks or months, not years; and the proteins that make up synapses have average lifetimes of only a few weeks or less. But human memories often last for 50 years or more. It makes no sense to believe that human memories that can last for 50 years are stored in synapses which last a few months at best, and which internally are subject to constant remodeling and restructuring because of the short lifetimes of synapse proteins.

In an article he wrote at the site The Conversation, USC scientist Dan Arnold describes his own results in a give-you-the-wrong-idea way, stating the following: "When we compared the 3D synapse maps before and after memory formation, we found that neurons in one brain region, the anterolateral dorsal pallium, developed new synapses while neurons predominantly in a second region, the anteromedial dorsal pallium, lost synapses." The results (as shown here) were actually that both regions lost and gained synapses at roughly equal rates. Arnold confesses, "It's still unknown whether synapse generation and loss actually drive memory formation."

So why is it that the press release for this work contained the untrue headline "USC team shows how memories are stored in the brain, with potential impact on conditions like PTSD"? Why is it that scientists so very often allow very untrue press releases about their work to be issued by the press offices of their universities, press releases that are making claims that are not supported by their work, and claims that often contradict the statements of such scientists? Is it because scientists are willing to condone lying hype to appear about their work, for the sake of getting more of the paper citations that scientists so much long for (the paper citation count being for a scientist being a number as important as a baseball player's batting average)?

A particularly pathetic aspect of the phony press release headline is that this counting of synapse losses and synapses gains in tiny zebrafish has a "potential impact on conditions like PTSD." Such research has no relevance to humans with post-traumatic stress syndome, and the claim that it does is as phony as the claim that the study "shows how memories are stored."

at January 12, 2022 No comments:

Labels: memory storage, synapse theory of memory

Wednesday, January 5, 2022

Suspect Shenanigans When You Hear Claims of "Mind Reading" Technology

The New Yorker recently published an extremely misleading article with a title of "The Science of Mind Reading," and with a subtitle of "Researchers are pursuing age-old questions about the nature of thoughts—and learning how to read them." The article (not written by a neuroscience scholar) provides no actual evidence that anyone is making progress trying to read thoughts from a brain.

The article starts out with a dramatic-sounding but extremely dubious narrative. We hear of experts trying to achieve communication with a Patient 23 who was assumed to be in a "vegetative state" after a bad injury five years ago. We read about the experts asking questions while scanning the patient's brain. They were looking for some brain signals that could be interpreted as a "yes" answer or "no" answer. We are told: "They would pose a question and tell him that he could signal 'yes' by imagining playing tennis, or 'no' by thinking about walking around his house."

We get this narrative (I will put unwarranted and probably untrue statements in **boldface**):

"Then he asked the first question: 'Is your father's name Alexander"

The man's premotor cortex ***lit up. He was thinking about tennis****—yes.*

'Is your father's name Thomas?'

Activity in the parahippocampal gyrus. ***He was imagining walking around his house****—no.*

'Do you have any brothers?'

Tennis—yes.

'Do you have any sisters?'

House—no."

Constantly foisted upon us by scientists and science writers, the claim that particular regions of the brain "light up" under brain scanning is untrue. Such claims are visually enforced by extremely deceptive visuals in which tiny differences of less than 1 percent are shown in bright red, thereby causing people to think the very slight differences are major differences. The truth is that all brain regions are active all the time. When a brain is scanned, there are only tiny signal differences that show up in a brain scan. Typically the differences will be no greater than about half of one percent, smaller than 1 part in 200. When scanning a brain, you can always see dozens of little areas that have a very slightly greater activity, and there is no reason to think that such variations are anything more than very slight chance variations. Similarly, if you were to analyze the blood flow in someone's foot, you would find random small variations in blood flow between different regions, with differences of about 1 part in 200.

Because of such random variations, there would never be any warrant for claiming that a person was thinking about a particular thing based on small fluctuations in brain activity. At any moment there might for random reasons be 100 different little areas in the brain that had 1 part in 200 greater activity, and 100 other different little areas in the brain that might have 1 part in 200 less activity. In this case no evidence has been provided of any ability to read thoughts of a person supposed to be in a vegetative state. We cannot reliably distinguish any signal from the noise.

The New Yorker article describing the case above refers us to a Los Angeles Times article entitled "Brains of Vegetative Patients Show Signs of Life." The article gives us no good evidence that thoughts were read from this patient 23. The article merely mentions that 54 patients in a vegetative state had their brains scanned, and that one of them (patient 23) seemed "several times" to answer "yes" or "no" correctly, based on examining fluctuations of brain activity. Given random variations in brain activity, you would expect to get such a result by chance if you scanned 54 patients who were completely unconscious. So no evidence of either consciousness or thought reading has been provided.

A look at the corresponding scientific paper shows that the fluctuations in brain activity were no more than about a half of one percent. No paper like this should be taken seriously unless the authors followed a rigorous blinding protocol, but the paper makes no mention of any blinding protocol being followed. Under a blinding protocol, anyone looking for signs of a "yes" or "no" answer would not know whether a "yes" answer was the correct answer. The paper provides no actual evidence either of thought reading by brain scanning or even of detection of consciousness. We merely have tiny 1-part-in-200 signal variations of a type we would expect to get by chance from scanning one or more of 54 patients who are all unconscious.

The paper tells that six questions were asked, and the authors seemed impressed that one of the 54 patients seemed to them to answer all six questions correctly (by means of brain fluctuations that the authors are subjectively interpreting). The probablility of getting six correct answers to yes-or-no questions by a chance method such as coin-flipping is 1 in two-to-the-sixth-power, or 1 in 64. So it is not very unlikely at all that you would get one such result testing 54 patients, purely by chance, even if all of the patients were unconscious and none of them understood the instructions they were given.

The New Yorker article then introduces Princeton scientist Ken Norman, incorrectly describing him as "an expert on thought decoding." Because no progress has been made on decoding thoughts from studying brains, no one should be described as an expert on such a thing. The article then gives us a very misleading passage trying to suggest that scientists are making some progress in understanding how a brain could produce or represent thoughts:

"Now, Norman explained, researchers had developed a mathematical way of understanding thoughts. Drawing on insights from machine learning, they conceived of thoughts as collections of points in a dense 'meaning space.' They could see how these points were interrelated and encoded by neurons."

To the contrary, no neuroscientist has the slightest idea of how thoughts could be encoded by neurons, nor have neuroscientists discovered any evidence that any neurons encode thoughts. It is nonsensical to claim that thoughts can be compared to points in three-dimensional space. Points in three-dimensional space are simple 3-number coordinates, but thoughts can be vastly more complicated. If I have the thought that I would love to be lounging on a beach during sunset while sipping lemonade, there is no way to express that thought as three-dimensional coordinates.

We then read about some experiment:

"Norman invited me to watch an experiment in thought decoding. A postdoctoral student named Manoj Kumar led us into a locked basement lab at P.N.I., where a young woman was lying in the tube of an fMRI scanner. A screen mounted a few inches above her face played a slide show of stock images: an empty beach, a cave, a forest. 'We want to get the brain patterns that are associated with different subclasses of scenes,' Norman said."

But then the article goes into a long historical digression, and we never learn of what the result is from this experiment. Norman is often mentioned, but we hear no mention of any convincing work he has done on this topic. Inaccurately described as "thought decoding," the attempt described above is merely an attempt to pick up signs in the brain of visual perception. Seeing something is not thinking about it. Most of the alleged examples of high-tech "mind reading" are merely claimed examples of picking up traces of vision by looking at brains -- examples that are not properly called "mind reading" (a term that implies reading someone's thoughts).

We hear a long discussion often mentioning Ken Norman, but failing to prevent any good evidence of high-tech mind reading. We read this claim about brain imaging: "The scripts and the scenes were real—it was possible to detect them with a machine." But the writer presents no evidence to back up such a claim.

Norman is a champion of a very dubious analytical technique called multi-voxel pattern analysis (MVPA), and seems to think such a technique may help read thoughts from the brain. A paper points out problems with such a technique:

"MVPA does not provide a reliable guide to what information is being used by the brain during cognitive tasks, nor where that information is. This is due in part to inherent run to run variability in the decision space generated by the classifier, but there are also several other issues, discussed here, that make inference from the characteristics of the learned models to relevant brain activity deeply problematic."

- Don't Be Fooled: Well-Trained Chatbots Aren't Minds
- What the Neuroscientist Should Have Said When Asked About Mind Uploading
- Cognitive Effects of Epilepsy Surgery Clash with "Brains Make Minds" Dogma
- Evolution Does Not Explain DNA, DNA Does Not Explain Bodies, and Bodies Do Not Explain Minds
- "Brain Chemical Imbalance" Theory Is Fading Out as an Explanation for Mental Illness
- Why Plasticity and Neurogenesis Fail to Explain Minds That Work Well After Massive Brain Tissue Loss
- They're Calling It a Huge Memory Research Fraud, But Is It Only the Tip of the Iceberg?
- So Much Misleading Talk Occurs in Claims of a Scientific Consensus
- Shrink-Speaking About a Mere "Problem of Consciousness" Is As Wrong As Shrink-Speaking About a Mere "Problem of Human Shape Origination"
- Longtermism Is Fueled by a Goofy Belief in Computer-Generated Lives
- Given Their Narrow Studies and Slim Narrow PhD Dissertations, Why Are We So Swayed by Neuroscience PhDs?
- Some of the Weak Papers Neuroscientists Cite As Evidence for Their Chief Claims
- For Insight About Your Brain and Mind, Ponder the Never-Founds
- TV Medical Dramas Give Us Wrong Ideas About Minds and Death
- Brain Imaging Shows No Appreciable Neural Correlates of Memory Activity
- The Evidence Inversion Syndrome Blights Academia
- Poorly Designed Brain Scan Experiments Needlessly Put the Needy at Risk
- Science Literature Is Full of Misleading Claims About Brain Waves
- The US Government's False Claims About DNA
- If Neuroscientists Acted Like Cosmologists, They Might Say You Have an Invisible "Dark Brain"
- Exceptionally Fast Thinking Cannot Be Explained by Slow Brains Like We All Have
- Scientists and Clergy Have Much in Common
- 30 Things That Would Never Occur If Prevailing Neuroscientist Dogmas

In a paper, Norman claims "This multi-voxel pattern analysis (MVPA) approach has led to several impressive feats of mind reading." Looking up two of the papers cited in support of this claim, I see that only four subjects were used in each study. Looking up another of the studies cited in support of this claim, I find that only five subjects were used for the experiment cited. This means none of these studies provided robust evidence (15 subjects per study group being the minimum for a moderately reliable result). This is what goes on massively in neuroscience papers: authors making claims that other papers showed some thing that the papers did not actually show, because poor methodology (usually including way-too-small sample sizes) occurred in the cited studies.

The New Yorker article then discusses a neuroscientist named Jack Gallant, stating the following: "Jack Gallant, a professor at Berkeley who has used thought decoding to reconstruct video montages from brain scans—as you watch a video in the scanner, the system pulls up frames from similar YouTube clips, based only on your voxel patterns—suggested that one group of people interested in decoding were Silicon Valley investors." Gallant has produced a Youtube.com clip entitled "Movie Reconstruction from Human Brain Activity."

On the left side of the video we see some visual images. On the right side of the video we see some blurry images entitled "Clip reconstructed from brain activity." We are left with the impression that scientists have somehow been able to get "movies in the mind" by scanning brains.

However, such an impression is very misleading, and what is going on smells like smoke and mirrors shenanigans. The text below the video explains the funky technique used. The videos entitled "clip reconstructed from brain activity" were produced through some extremely elaborate algorithm that mainly used inputs *other than brain activity*. Here is the description of the technique used:

"[1] Record brain activity while the subject watches several hours of movie trailers. [2] Build dictionaries (i.e., regression models) that translate between the shapes, edges and motion in the movies and measured brain activity. A separate dictionary is constructed for each of several thousand points at which brain activity was measured....[3] Record brain activity to a new set of movie trailers that will be used to test the quality of the dictionaries and reconstructions. [4] Build a random library of ~18,000,000 seconds (5000 hours) of video downloaded at random from YouTube. (Note these videos have no overlap with the movies that subjects saw in the magnet). Put each of these clips through the dictionaries to generate predictions of brain activity. Select the 100 clips whose predicted activity is most similar to the observed brain activity. Average these clips together. This is the reconstruction."

This bizarre and very complicated rigmarole is some very elaborate scheme in which brain activity is only one of the inputs, and the main inputs are lots of footage from Youtube videos. It is very misleading to identify the videos as "clip reconstructed from brain activity," as the clips are mainly constructed from data other than brain activity. No actual evidence has been produced that someone detected anything like "movies in the brain." It seems like merely smoke and mirrors under which some output from a variety of sources (produced by a ridiculously complicated process) is being passed off as something like "movies in the brain."

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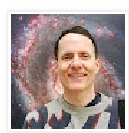

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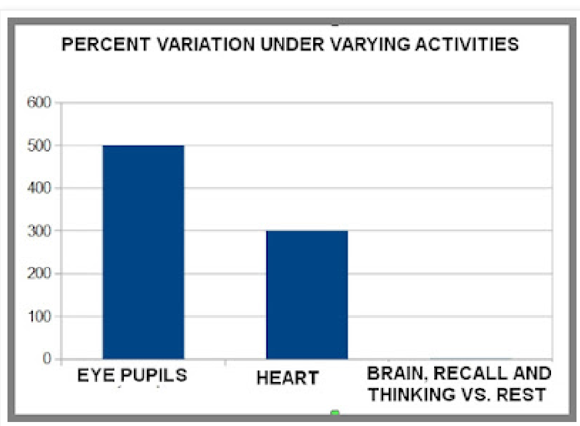
Similar types of extremely dubious convoluted methods seem to be going on in the papers here co-authored by Gallant:

- "Reconstructing Visual Experiences from Brain Activity Evoked by Natural Movies"
- Bayesian Reconstruction of Natural Images from Human Brain Activity"

In both of these papers, we have a kind of byzantine methodology in which bizarre visual montages or artificial video clips are constructed. For example, the second paper resorts to "an averaged high posterior (AHP) reconstruction by averaging the 100 clips in the sampled natural movie prior that had the highest posterior probability." The claim made by the New Yorker -- that Gallant has "used thought decoding to reconstruct video montages from brain scans" is incorrect. Instead, Gallant is constructing visual montages using some extremely elaborate and hard-to-justify methodology (the opposite of straightforward), and brain scans are merely one of many inputs from which such montages are constructed. This is no evidence of technology reading thoughts or imagery from brains. In both of the papers above, only three subjects were used. 15 subjects per study group is the minimum for a moderately compelling experimental result. And since neither paper uses a blinding protocol, the papers fail to provide robust evidence of anything.

The rest of the New Yorker article is mainly something along the lines of "well, if we've made *this* much progress, what wonderful things may be on the horizon?" But no robust evidence has been provided that any progress has been made in reading thoughts or mental imagery from brains. The author has spent quite a while interviewing and walking around with scientist Ken Norman, and has accepted "hook, line and sinker" all the claims Norman has made, without asking any tough questions, and without critically analyzing the lack of evidence behind his more doubtful claims and the dubious character of the methodologies involved. The article is written by a freelance writer who has written on a very wide variety of topics, and who shows no signs of being a scholar of neuroscience or the brain or philosophy of mind issues.

There are no strong neural correlates of either thinking or recall. As discussed here, brain scan studies looking for neural correlates of thinking or recall find only very small differences in brain activity, typically smaller than 1 part in 200. Such differences are what we would expect to see from chance variations, even if a brain does not produce thinking and does not produce recall. The chart below illustrates the point.



What typically goes on in some study claiming to find some neural correlate of thinking or recall is professor pareidolia. Pareidolia is when someone hoping to find some pattern reports a pattern that isn't really there, like someone eagerly scanning his toast each day for years until he finally reports finding something that looks to him like the face of Jesus. A professor examining brain scans and eagerly hoping to find some neural signature or correlate of thinking or recall may be as prone to pareidolia as some person scanning the clouds each day eagerly hoping to find some shape that looks like an angel.

There are ways for scientists to help minimize the chance that they are reporting patterns because of pareidolia. One way is the application of a rigorous blinding protocol throughout an experiment. Another way is to use adequate sample sizes such as 15 or 30 subjects per study group. Most neuroscience experiments fail to follow such standards. The shockingly bad tendencies of many experimental biologists was recently revealed by a replication project that found a pitifully low replication rate and other severe problems in a group of biology experiments chosen to be replicated.

Postscript: The latest example of needless risk to subjects for the sake of unfounded "mind reading by brain scanning" claims is a study with a preprint entitled "Semantic reconstruction of continuous language from non-invasive brain recordings." The study failed to show any good evidence for anything important, as it used a way too-small study group size of only seven subjects (15 subjects per study group is the minimum for a moderately impressive result). Following Questionable Research Practices, the scientists report no sample size calculation, no blinding protocol, no pre-registration, no control group, and no effect size. The only "statistical significance" reported is what smells like "p-hacking" kind of results of the bare minimum for publication (merely $p < .05$). For these basically worthless results, seven subjects endured something like 16 hours of brain scanning with a 3T scanner, which is more than 30 times longer than they would have had for a diagnostic MRI. Senselessly, this study has been reported by our ever-credulous science press as some case of reading thoughts by brain scanning. It is no evidence of any such thing.

at January 05, 2022 No comments:

Labels: claims of mind reading by brain scans

Friday, December 31, 2021

NSF Grant Tool Query Suggests Engrams Are Not Really Science

An engram is a hypothetical spot in the brain where there is alleged to be a memory trace, an alteration in brain matter caused by the storage of memory. While scientists have claimed that there are countless engrams in your head, the notion of an engram has no robust scientific evidence behind it. No robust evidence for engrams has been found in any organism. Every study that has claimed to provide evidence for the existence of an engram has had problems that should cause us to doubt that good evidence for engrams was provided.

In a previous post I pointed out the not-really-science status of engrams by doing some queries on major preprint servers that store millions of scientific papers, servers such as the physics paper preprint server (which includes quanitative biology papers), the biology preprint server and the psychology preprint server. The queries (searching for papers that used the word "engram") showed only the faintest trace of scientific papers mentioning "engrams" in their titles. Only a handful of papers used that word in their title.

September 2018 (1)
August 2018 (1)
July 2018 (1)
June 2018 (1)
April 2018 (30)

Labels

- "brain as computer" metaphor
- academia dysfunction
- adult neurogenesis
- AI
- binary memory storage theory
- brain changes with age
- brain connectivity
- brain effect on personality
- brain imaging
- brain injury
- brain research projects
- brain shortfalls
- brain signal speed
- brain surgery
- brain uploading
- brain waves
- claims of mind reading by brain scans
- claims of neural correlates of mental activity
- COVID-19
- decisions
- default mode network
- dendritic spines
- depression
- distributed recall hypothesis
- DNA
- EEG studies
- emergence
- epilepsy
- ESP
- evolution
- exceptional memory
- exceptional speed of thinking
- file drawer effect
- fraud
- free will
- genes
- global workspace theory
- groupthink
- health hazards in neuroscience experiments
- hemispherectomy
- high mental function despite large brain damage

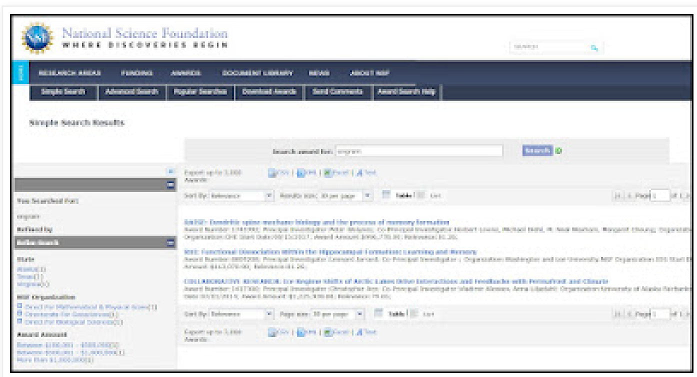
An examination of such papers (discussed in my post) showed they provided nothing like any substantial evidence for the existence of any such thing as an engram.

There is another way of testing whether this concept of engrams has any real observational support. We can use the grant search tool of the National Science Foundation. The National Science Foundation is a US institution that doles out billions of dollars each year in grants for scientific research. You can use the NSF's grant query tool to find out how much research money is being allocated to research particular topics.

You can perform the search by using the URL below:

https://www.nsf.gov/awardsearch/simpleSearchResult?queryText=engram

The results we get are the results shown below. We get only 3 matches. The last match is some climate paper having nothing to do with memory. So our search has produced only two National Science Foundation grants relating to the topic of engrams.



The second project ("Functional Dissociation Within the Hippocampal Formation: Learning and Memory") completed in 1992. Clicking on the link to the project, we see that $163,000 was spent, but no scientific papers are listed as resulting from the project.

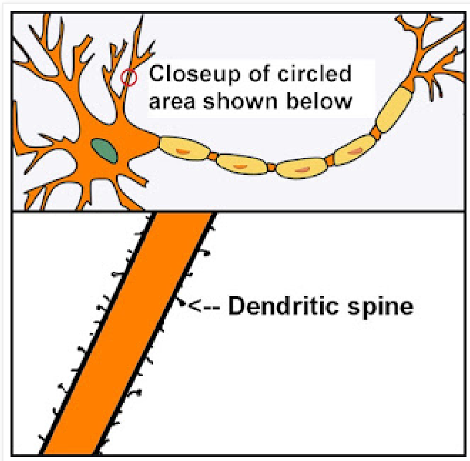
The first grant is a grant of $996,778.00 (nearly one million dollars) that was given to a project entitled "Dendritic spine mechano-biology and the process of memory formation." The project started in 2017 and has a listed end date of July, 2022. The project description gives us a statement of speculative dogma regarding memory storage. There are actually very good reasons why the speculations cannot be correct. Below is the statement from the project description:

"The initiation of learning begins with changes at neuronal synapses that can strengthen (or weaken) the response of the synapse. This process is termed synaptic plasticity. Stimuli that produce learning lead to structural changes of the post-synaptic dendritic spine. The initial events of memory and learning include a temporary rise in calcium concentrations and activation of a protein called calmodulin. The next step is activation of calmodulin-dependent enzyme, kinase II (CaMKII). At the same time, structural rearrangements occur in the actin cytoskeleton leading to an enlargement of the spine compartment. How these initial events lead to remodeling of the actin cytoskeleton is largely unknown. This project focuses on the events that lead to the changes in actin cytoskeleton. The research also addresses the

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

question of how these structural changes in the actin cytoskeleton are used to maintain memory."

To see why the main parts of the statement are not well-founded in observations, let us consider dendritic spines. A dendritic spine is a tiny protrusion from one of the dendrites of a neuron. The diagram below shows a neuron in the top half of the diagram. Some dendritic spines are shown in the bottom half of the visual. The bottom half of the visual is a closeup of the red-circled part in the top of the diagram.



An individual neuron in the brain may have about a thousand such dendritic spines. The total number of dendritic spines in the brain has been estimated at 100 trillion, which is about a thousand times greater than the number of neurons in the brain. The total number of synapses in the brain has also been estimated at 100 trillion. A large fraction of synapses are connected to dendritic spines.

Now, given such a high number of dendritic spines and synapses, we have the interesting situation that there is no possibility of correlating the learning of something and a strengthening of synapses or a strengthening or enlarging or growth of dendritic spines. Even if we are testing only a mouse, we still have an animal with trillions of dendritic spines and trillions of synapses. Scientists are absolutely unable to measure the size, strength or growth of all of those dendritic spines and synapses. The technology for doing that simply does not exist. What scientists can do is inspect a very small number of dendritic spines, taking snapshots of their physical state. But no such inspection would ever allow you to conclude that one or more dendritic spines had increased in size or grown or strengthened because some learning had occurred. Since dendritic spines slowly increase and decrease in size in an apparently random fashion, there is no way to tell whether the increase or decrease of a dendritic spine (or a small number of such spines) is being caused by learning or by the formation of a memory.

Therefore the statements below (quoted above) cannot be well-founded:

"The initiation of learning begins with changes at neuronal synapses that can strengthen (or weaken) the response of the synapse. This process is termed synaptic plasticity. Stimuli that produce learning lead to structural changes of the post-synaptic dendritic spine."

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

In fact, we know of the strongest reason why the hypothesis underlying such a claim cannot be true. The reason is that human memories are often extremely stable and long lasting, while dendritic spines and synapses are unstable, fluctuating things that have typical lifetimes of a few months or weeks. Read here to find some papers supporting such a claim. I can quote some scientists (Emilio Bizzi and Robert Ajemian) on this topic:

"If we believe that memories are made of patterns of synaptic connections sculpted by experience, and if we know, behaviorally, that motor memories last a lifetime, then how can we explain the fact that individual synaptic spines are constantly turning over and that aggregate synaptic strengths are constantly fluctuating? How can the memories outlast their putative constitutive components?"

The word "outlast" is a huge understatement here, for the fact is that human memories such as 50-year-old memories last very many times longer than the maximum lifetime of dendritic spines and synapses, and such memories last 1000 times longer than the protein molecules that make up such spines and synapses (which have average lifetimes of only a few weeks or less).

But enough of this long disputation of the claims made in the project description of the project entitled "Dendritic spine mechano-biology and the process of memory formation." Now let's look at what the million-dollar project has published so far in the way of results. We can see that by going to this page looking at the section entitled "PUBLICATIONS PRODUCED AS A RESULT OF THIS RESEARCH." The last three of these papers do not mention memory or engrams, so we may assume that they did nothing to substantiate claims about neural storage places of memory (engrams). The only paper mentioning memory or engrams in its title is a paper entitled "Exploring the F-actin/CPEB3 interaction and its possible role in the molecular mechanism of long-term memory." The paper can be read in full here.

The paper does not do anything to substantiate claims that memories are stored in engrams in the brain. The paper merely presents a speculative chemistry model and some speculative computer simulations. No experiments with animals have been done, and no research on human brains has been done. Apparently, there were no lab experiments of any type done, with all of the "experimentation" going on inside computers. The computer simulations do not involve the biochemical storage or preservation of any learned information. The quotes below help show the wildly speculative nature of the paper (I have put in boldface words indicating that speculation is occurring).

*"Here we study the interaction between actin and CPEB3 and propose a molecular **model** for the complex structure of CPEB3 bound to an actin filament... Our **model** of the CPEB3/F-actin interaction suggests that F-actin **potentially** triggers the aggregation-prone structural transition of a short CPEB3 sequence....The CPEB/F-actin interaction **could** provide the mechanical force necessary to induce a structural transition of CPEB oligomers from a coiled-coil form into a beta-sheet–containing amyloid-like fiber...This beta-hairpin acts as a catalyst for forming intramolecular beta-sheets and **could** thereby help trigger the aggregation of CPEB3....These beta-sheets **could**, in turn, participate in further intermolecular interactions with free CPEB3 monomers, triggering a cascade of aggregation....Several*

possible *mechanisms by which SUMOylation* ***could*** *regulate the CPEB3/F-actin interaction are discussed in SI Appendix....*
We propose that SUMOylation of CPEB3 in its basal state ***might*** *repress the CPEB3/F-actin interaction....Furthermore, the beta-hairpin form of the zipper suggests that it* ***might*** *be able to trigger extensive beta-sheet formation in the N-terminal prion domain, PRD....The beta hairpin form of zipper sequence is a* ***potential*** *core for the formation of intramolecular beta sheets... The maintenance of the actin cytoskeleton and synaptic strength then* ***might*** *involve the competition between CPEB3 and cofilin or other ABPs....We also propose that the CPEB3/F-actin interaction* ***might*** *be regulated by the SUMOylation of CPEB3, based on bioinformatic searches for* ***potential*** *SUMOylation sites as well as SUMO interacting motifs in CPEB3....We therefore propose that SUMOylation of CPEB3 is a* ***potential*** *inhibitor for the CPEB3/F-actin interaction."*

The wildly speculative nature of the paper is shown by the boldface words above, and by the sentence at the end of the paper's long "Results" section: "Further experimental and theoretical work is required to determine which, if any, of these mechanisms is operating in neurons." Note well the phrase "which, if any" here. This is a confession that the authors are not sure a single one of the imagined effects actually occur in a brain.

In this case the US government paid a million dollars for essentially a big bucket of "mights" and "coulds," and the authors do not seem confident that any of these speculative effects actually occur in the brain. Whatever is going on here, it doesn't sound like science with a capital S (which I define as facts established by observations or experiments). Even if all of the wildly speculative "mights" and "coulds" were true, it still would not do a thing to show that memories lasting fifty years can be stored in dendritic spines and synapses that do not last for years, and are made up of proteins that have average lifetimes of only a few weeks. The idea that changes in synapse *strength* can store complex learned information has never made any sense. Information is physically stored not by some mere strengthening but by when some type of coding system is used to write information using tokens of representation. Never does a mere strengthening store information. The idea that you store memories by synapse strengthening makes no more sense than the idea that you learn school lessons by strengthening your arm muscles. If memories were stored as differences in synapse strengths, you could never recall such memories: because the brain lacks any such thing as a synapse strength reader.

at December 31, 2021 No comments:

Labels: memory storage

Wednesday, December 22, 2021

A New Paper Reminds Us Neuroscientists Can't Get Their Story Straight About Memory Storage

There is a new scientific paper with the inappropriate title "Where is Memory Information Stored in the Brain?" This is not the question we should be asking. The question we should be asking is: "Is memory information stored in the brain?" Although it was probably not the intention of the authors (James Tee and Desmond P. Taylor), what we get in the paper is a portrait of how neuroscientists are floundering around on this topic, like some poor shark that is left struggling in the sand after going after its prey too aggressively.

Tee and Taylor claim this on page 5: "Based on his discovery of the synapse as the physiological basis of memory storage, Kandel was awarded the year 2000 Nobel Prize in Physiology or Medicine (Nobel Prize, 2000)." This is a misstatement about a very important topic. The Nobel Prize listing for Kandel does not mention memory. The official page listing the year 2000 Nobel Prize for physiology states only the following: "The Nobel Prize in Physiology or Medicine 2000 was awarded jointly to Arvid Carlsson, Paul Greengard and Eric R. Kandel 'for their discoveries concerning signal transduction in the nervous system.' " The Nobel committee did not make any claim that synapses had been discovered as the basis of memory.

Before making this claim about the Nobel Prize, Tee and Taylor state something that makes no sense. They state, "The groundbreaking work on how memory is (believed to be) stored in the human brain was performed by the research laboratory of Eric R. Kandel on the sea slug Aplysia (Kupfermann et al., 1970; Pinsker et al., 1970)." How could research on a tiny sea slug tell us how *human beings* store memories? The paper in question can be read here. The paper fails to mention a testing of more than a single animal, thereby strongly violating rules of robust experimental research on animals (under which an effect should not be claimed unless at least 15 subjects were tested). We have no reliable evidence about memory storage from this paper. If the paper somehow led to its authors getting a Nobel Prize, that may have been a careless accolade. The Nobel Prize committee is pretty good about awarding prizes only to the well-deserved, but it may occasionally fall under the gravitational influence of scientists boasting about some "breakthrough" that was not really any such thing.

Equally undeserving of a Nobel Prize was the next research discussed by our new paper on memory storage: research claiming a discovery of "place cells" in the hippocampus. John O' Keefe published a paper in 1976 claiming to detect "place units" in the hippocampus of rats. The paper also used the term "place cells." The claim was that certain cells were more active when a rat was in a certain spatial position. The paper did not meet standards of good experimental science. For one thing, the study group sizes it used were way too small for a robust evidence to have produced. One of the study group sizes consisted of only five rats, and another study group size consisted of only four rats. 15 animals per study group is the minimum for a moderately convincing result. For another thing no blinding protocol was used. And the study was not a pre-registered study, but was apparently one of those studies in which an analyst is free to fish for whatever effect he may feel like finding after data has been collected.

The visuals in the study compare wavy signal lines collected while a rat was in different areas of an enclosed unit. The wavy signal lines look pretty much the same no matter which area the rats were in. But O'Keefe claims to have found differences. No one should be persuaded that the paper shows robust evidence for an important real effect. We should suspect that the analyst has looked for stretches of wavy lines that looked different when the rat was in different areas, and chosen stretches of wavy lines that best-supported his claim that some cells were more active when the rats were in different areas. Similar Questionable Research Practices (with similar too-small study groups such as four rats) can be seen in O'Keefe's 1978 paper here.

Although O'Keefe's 1976 paper and 1978 paper were not at all a robust demonstration of any important effect, the myth that "place cells" had been discovered started to spread around among neuroscience professors. O'Keefe even got a Nobel Prize. The Nobel Prize committee is normally pretty good about awarding prizes only when an important discovery has been made for which there was very good evidence. Awarding O'Keefe a Nobel Prize for his unconvincing work on supposed "place cells" seems like another flub of the normally trusty Nobel Prize committee. Even if certain cells are more active when rats are in certain positions (something we would always expect to observe from chance variations), that does nothing to show that there is anything like a map of spatial locations in the brain of rats.

On page 7 of the new paper on memory storage, we have a discussion of equally unconvincing results:

"LeDoux found that this conditioned fear resulted in LTP (strengthening of synapses) in the auditory neurons of the amygdala, to which he concluded that the LTP constituted memory of the conditioned fear. That is, memory was stored by way of strengthening the synapses, as hypothesized by Hebb."

You may understand why this is nothing like convincing evidence when you realize that synapses are constantly undergoing random changes. At any moment billions of synapses may be weakening, and billions of other synapses may be strengthening. So finding some strengthening of synapses is no evidence of memory formation. It is merely finding what goes on constantly in the brain, with weakening of synapses occurring just as often as strengthening. The new paper on memory storage confesses this when it says on page 8 that: "synapses in the brain are constantly changing, in part due to the inevitable existence of noise."

On pages 8-9 of the new paper, Tee and Taylor say that scientists had hopes that there would be breakthroughs in handling memory problems by studying synapses, but that "the long-awaited breakthroughs have yet to be found, raising some doubts against Hebb’s synaptic [memory storage] hypothesis and the subsequent associated experimental findings." Tee and Taylor give us on page 9 a quotation from two other scientists, one that gives a great reason for rejecting theories of synaptic memory storage:

"If we believe that memories are made of patterns of synaptic connections sculpted by experience, and if we know, behaviorally, that motor memories last a lifetime, then how can we explain the fact that individual synaptic spines are constantly turning over and that aggregate synaptic strengths are constantly fluctuating? How can the memories outlast their putative constitutive components?"

Tee and Taylor then tell us that this problem does not just involve motor memories:

"They further pointed out that this mystery existed beyond motor neuroscience, extending to all of systems neuroscience given that many studies have found such constant turn over of synapses regardless of the cortical region. In order words, synapses are constantly changing throughout the entire brain: 'How is the permanence of memory constructed from the evanescence of synaptic spines?' (Bizzi & Ajemian, 2015, p. 92). This is perhaps the biggest challenge against the notion of synapse as the physical basis of memory."

Tee and Taylor then discuss various experiments that defy the synaptic theory of memory storage. Most of the studies are guilty of the same Questionable

Research Practices that are so extremely common in neuroscience research these days, so I need not discuss them. We hear on page 14 about various scientists postulating theories that are alternatives to the synaptic theory of memory storage:

"The logical question to pose at this point is: if memory information is not stored in the synapse, then where is it? Glanzman suggested that memory might be stored in the nucleus of the neurons (Chen et al., 2014). On the other hand, Tonegawa proposed that memory might be stored in the connectivity pathways (circuit connections) of a network of neurons (Ryan et al., 2015). Hesslow emphasized that memory is highly unlikely to be a network property (in disagreement with Tonegawa), and further posited that the memory mechanism is intrinsic to the neuron (in agreement with Glanzman) (Johansson et al., 2014)."

You get the idea? These guys are in disarray, kind of all over the map, waffling around between different cheesy theories of memory storage. All of the ideas mentioned above have their own fatal difficulties, reasons why they cannot be true. In particular, there is no place in a neuron where memory could be written, with the exception of DNA and RNA; and there is zero evidence that learned knowledge such as episodic memories and school lessons are stored in DNA or RNA (capable of storing only low-level chemical information). Human DNA has been extremely well-studied by long well-funded multi-year research projects such as the Human Genome Project completed in 2003 and the ENCODE project, and no one has found a bit of evidence of anything in DNA that stores episodic memory or any information learned in school.

Tee and Taylor then give us more examples of experiments that they think may support the idea of memories stored in the bodies of neurons (rather than synapses). But they fail to actually support such an idea because the studies follow Questionable Research Practices. For example, they cite the study here, which fails to qualify as a robust well-designed study because it uses study group sizes as small as 9, 11 and 13. To give another example, Tee and Taylor cite the Glanzman study here, which fails to qualify as a robust well-designed study because it uses study group sizes as small as 7. Alas, the use of insufficient sample sizes is the rule rather than the exception in today's cognitive neuroscience, and Tee and Taylor seem to ignore this problem.

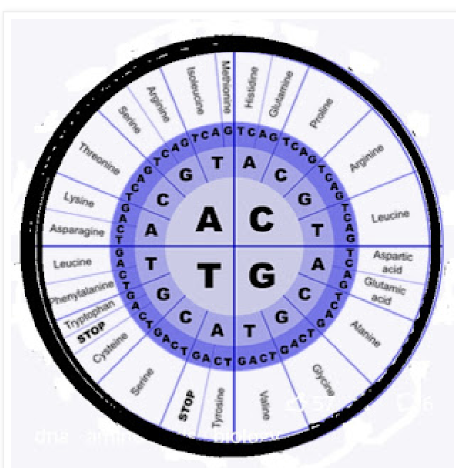
The heavily hyped Glanzman study (guilty of Questionable Research Practices) claimed a memory transfer between aplasia animals achieved by RNA injections. Such a study can have little relevance to permanent memory storage, because RNA molecules have very short lifetimes of less than an hour.

Finally in Tee and Taylor's paper, we have a Conclusions section, which begins with this confession which should cause us to doubt all claims of neural memory storage: "After more than 70 years of research efforts by cognitive psychologists and neuroscientists, the question of where memory information is stored in the brain remains unresolved." This is followed by a statement that is at least true in the first part: "Although the long-held synaptic hypothesis remains as the de facto and most widely accepted dogma, there is growing evidence in support of the cell-intrinsic hypothesis." It is correct to call the synaptic memory hypothesis a dogma (as I have done repeatedly on this blog). But Tee and Taylor commit an error in claiming "there is growing evidence in support of the cell-intrinsic hypothesis" (the hypothesis that memories are stored in the bodies of neurons rather than synapses that are part of connections between neurons). There is no robust evidence in support of such a hypothesis, and the papers Tee and Taylor have cited as supporting such a hypothesis are unconvincing because of their Questionable Research Practices such as too-small sample sizes.

On their last two page the authors end up in shoulder-shrugging mode, saying, "while the cell might be storing the memory information, the synapse might be required for the initial formation and the subsequent retrieval of the memory." We are left with the impression of scientists in disarray, without any clear idea of what they are talking about, rather like some theologian speculating about exactly where the angels live in heaven, bouncing around from one idea to another. In their last paragraph Tee and Taylor speculate about memories being inherited from one generation to another by DNA, which is obviously the wildest speculation.

Our takeaway from Tee and Taylor's recent paper should be this: scientists are in baffled disarray on the topic of memory. They have no well-established theory of memory storage in the brain, and are waffling around between different speculations that contradict each other. We are left with strong reasons for suspecting that scientists are *getting nowhere* trying to establish a theory of memory storage in the brain. This is pretty much what we should expect if memories are not stored in brains, and cannot be stored in brains. Always be very suspicious when someone says something along the lines of, "What scientists have been teaching for decades is not true, but they have a new theory that has finally got it right." More likely the new theory is as false as the old theory.

If anyone is tempted to put credence in this "cell-intrinsic hypothesis" of memory storage, he should remind himself of the physical limitations of DNA. DNA uses what is called the genetic code. The genetic code is shown below. The A, C, T and G letters at the center stand for the four types of nucleotide base pairs used by DNA: adenine (A), cytosine (C), guanine (G), and thymine (T). Different triple combinations of these base pairs stand for different amino acids (the twenty types of chemicals shown on the outer ring of the visual below).



So DNA is profoundly limited in what it can store. In the human body DNA can only store low-level chemical information. We know of no way in which DNA in a human body could store any such things as information learned in school or episodic memories. Such things cannot be stored using the genetic code used by DNA. No one has ever found any evidence that strings of characters (such as memorized text) are stored in human DNA, nor has anyone found any evidence that visual information is stored in human DNA. Moreover, if we had to write memories to DNA or read memories from DNA, it would be all-the-more impossible to explain the phenomena of instant memory formation and instant memory retrieval.

Some have suggested that DNA methylation marks might be some mechanism for memory storage. This idea is very unbelievable. DNA methylation is the appearance of a chemical mark on different positions of DNA. The chemical mark is almost always the same H_3C addition to the cytosine nucleotide base pair. These chemical marks serve as transcription suppressors which prevent particular genes from being expressed. Conceptually we may think of a DNA methylation mark as an "off switch" that turns off particular genes.

The idea that the collection of these chemical "off switches" can serve as a system for storing memories is unbelievable. DNA is slowly read by cells in a rather sluggish process called transcription, but there is no physical mechanism in the body for specifically reading only DNA methylation marks. If there were anything in the body for reading only DNA methylation marks, it would be so slow that it could never account for instant memory recall. We know the purpose that DNA methylation marks serve in the body: the purpose of switching off the expression of particular genes. Anyone claiming that such marks also store human memories is rather like some person claiming that his laundry detergent is a secret system for storing very complex information.

A metric relevant to such claims is the maximum speed of DNA transcription. The reading of DNA base pairs occurs at a maximum rate of about 20 amino acids per second, which is about 60 nucleotide pairs per second. This is the fastest rate, with preparatory work being much slower. DNA methylation occurs only for one of the four base pairs, meaning that no more than about 15 DNA methylation marks could be read in a second (after slower preparatory work is done).

Let us imagine (very implausibly) that DNA methylation marks serve as a kind of binary code for storing information. Let us also imagine (very implausibly) that there is a system by which letters can be stored in the body, by means of something like the ASCII code, and by means of DNA methylation. Such a system would have storage requirements something like this:

Letter	ASCII number equivalent	Binary equivalent
A	12	1100
B	13	1101
C	14	1110

Under such a storage system, once the exact the spot had been found for reading the right information (which would take a very long time given that the brain has no indexing system and no position coordinate system), and after some chemical preparatory work had been done to enable reading from DNA, information could be read at a rate of no more than about four characters per second. But humans can recall things much faster than such a rate. When humans talk fast, they are speaking at a rate of more than two words per second (more than 10 characters per second). So if you ask me to describe how the American Civil War began and started and ended, I can spit out remembered information at a rate several times faster than we can account for by a reading of DNA methylation marks, even if we completely ignore the time it would take to find the right little spot in the brain that stored exactly the right information to be recalled.

A realistic accounting of the time needed for memory recall of information stored in binary form by DNA methylation would have to add up all of these things:

- The time needed for finding the exact spot in the brain where the correct recalled information was stored (requiring many minutes or hours or days, given no indexing and no coordinate system in the brain);
- The time needed for chemical preparatory work that would have to be done before DNA can be read (such as the time needed to get RNA molecules that can do the reading);
- Reading DNA methylation marks (encoding binary numbers) at a maximum rate of no more than four characters per second (and usually a much slower rate because of a sparse scattering of such marks);
- Translating such binary numbers into their decimal equivalent;
- Translating such decimal numbers into character equivalents;
- Translating such retrieved letters into speech.

All of this would be so slow that if memories were stored as DNA methylation marks, you would never be able to speak correct recalled information at a rate a tenth as fast as two words per second, as humans can do. Similarly, you would never be able to form new memories instantly (as humans are constantly doing) if memory storage required writing binary information as DNA methylation marks, which would be a very slow process. Humans can form new memories at the same rate at which they can recall memories. Suppose you are leaving to go food shopping and someone in your house says, "Please buy me a loaf of whole wheat bread and some orange juice." You may form a new memory of those exact words, at a rate of two words per second. Storing such information as DNA methylation marks would be much slower than such a rate.

I may note that while scientists can read DNA and DNA methylation marks from neural tissue, no one has ever found the slightest speck of human learned information stored in DNA or DNA methylation marks, synapse strengths, or any other type of representation in the brain; nor has anyone found any evidence of any coding scheme by which letters or numbers or visual images are stored in human DNA or DNA methylation marks. When brain surgeons remove half of a brain (to treat very severe seizures) or remove portions of a brain (to treat severe epilepsy or cancer), they discard the cut-out brain tissue, and do not try to retrieve memory information stored in it. They know that attempting such a thing would be utterly futile.

at December 22, 2021 No comments:

Labels: memory storage, neuron nicknames

Wednesday, December 15, 2021

Scientific American's "New Clues" on Mind Origins Sound Like a Handful of Moonbeams

Scientific American recently published an article by two biology professors, an article on the origin of mind. We have a clickbait title of "New Clues About the Origin of Biological Intelligence," followed by a misleading subtitle of "A common solution is emerging in two different fields: developmental biology and neuroscience." Then, contrary to their subtitle, the authors (Rafael Yuste and Michael Levin) state, "While scientists are still working out the details of how the eye evolved, we are also still stuck on the question of how intelligence emerges in biology." So now biologists are saying they are still stuck on both of these things?

Funny, that's a claim that contradicts what biologists have been telling us for many decades. For many decades, biologists have made the bogus boast that the mere "natural selection" explanation of Charles Darwin was sufficient to explain the appearance of vision, a claim that has never made any sense, because so-called natural selection is a mere theory of accumulation that does not explain any cases of vast organization such as we see in vision systems and their incredibly intricate biochemistry. Vastly organized things (such as bridges and cells and TV sets and protein complexes) are not mere accumulations (examples of which are snowdrifts, leaf piles and drain sludge buildup). And biologists have also for many decades been making the equally bogus boast that they understand the origin of human minds, based on the claim that it was just an evolution of bigger or better brains (a claim that is false for reasons explained in the posts on this blog).

It would be great if our Scientific American article was a frank explanation of why scientists are stuck on such things. But instead the article is an example of a staple of science literature: an article that not-very-honestly kind of claims "we're getting there" on some explanatory problem which scientists are actually making little or no progress on. To read about the *modus operandi* of many articles of this type, read my post *" 'We're Getting There' Baloney Recurs in Science Literature."*

We quickly get an inkling of a strategy that will be used by the authors. It is a strategy similar to the witless or deceptive strategy Charles Darwin used in *The Descent of Man* when he claimed this near the beginning of Chapter 3: “My object in this chapter is to show that there is no fundamental difference between man and the higher mammals in their mental faculties." The statement was a huge falsehood, and it is easy to understand why Darwin made it. The more some biologist tries to shrink and minimize the human mind, like someone saying the works of Shakespeare are "just some ink marks on paper," the more likely someone may be to believe that such a biologist can explain the mind's origin. The more a biologist dehumanizes humans, making them sound like animals, the more likely someone may be to think that such a biologist can explain the origin of humans.

Rather seeming to follow such a strategy, the authors (Yuste and Levin) try to fool us into thinking there is nothing very special about intelligence. They write this:

"In fact, intelligence—a purposeful response to available information, often anticipating the future—is not restricted to the minds of some privileged species. It is distributed throughout biology, at many different spatial and temporal scales. There are not just intelligent people, mammals, birds and cephalopods. Intelligent, purposeful problem-solving behavior can be found in parts of all living things: single cells and tissues, individual neurons and networks of neurons, viruses, ribosomes and RNA fragments, down to motor proteins and molecular networks."

Notice the gigantically shrunken and downgraded definition of intelligence, as a mere "purposeful response to available information." Under such a definition, a smoke detector is intelligent, and bicycle brakes are intelligent (because they respond to information about foot pressure or hand pressure); and an old round 1960's Honeywell thermostat is also intelligent, because if I set the thermostat to 70, and it got much colder outside, the thermostat turned up the heat to keep the temperature at 70. But smoke detectors and bicycle brakes and old Honeywell thermostat are not intelligent, and neither are the much newer computerized thermostats that are marketed as "intelligent thermostats."

The Merriam-Webster dictionary gives us two definitions of intelligence:

"(1) the ability to learn or understand or to deal with new or trying situations **:** *REASON.*

(2) the ability to apply knowledge to manipulate one's environment or to think abstractly as measured by objective criteria (such as tests)."

Very obviously, such a definition does not apply to some of the things that our Scientific American biologists have claimed are intelligent: "single cells and tissues, individual neurons and networks of neurons, viruses, ribosomes and RNA fragments, down to motor proteins and molecular networks." Such things may be driven or may have been designed by some mysterious intelligent power greater than the human mind, but they are not intelligent themselves. Protein molecules, ribosomes and individual cells do not have minds or intelligence. Rather than referring to such things as examples of "biological intelligence," Yuste and Levin should have merely called such things examples of "biological responsiveness."

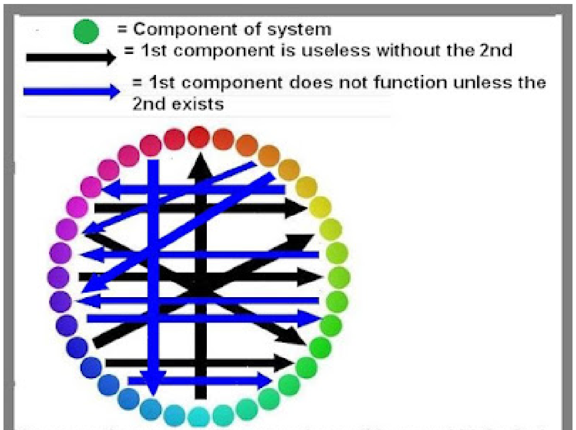
Our authors then give us a paragraph that is misleading and poorly reasoned. We read this:

"A common solution is emerging in two different fields: developmental biology and neuroscience. The argument proceeds in three steps. The first rests on one of natural selection's first and best design ideas: modularity. Modules are self-contained functional units like apartments in a building. Modules implement local goals that are, to some degree, self-maintaining and self-controlled. Modules have a basal problem-solving intelligence, and their relative independence from the rest of the system enables them to achieve their goals despite changing conditions. In our building example, a family living in an apartment could carry on their normal life and pursue their goals, sending the children to school for example, regardless of what is happening in the other apartments. In the body, for example, organs such as the liver operate with a specific low-level function, such as controlling nutrients in the blood, in relative independence with respect to what is happening, say, in the brain."

The claim that "modularity" was one of "natural selection's first and best design ideas" is false. A module is defined by the Cambridge Dictionary as "one of a set of separate parts that, when combined, form a complete whole." In computing and spacecraft and education, each module is itself a complex thing that can exist independently, and such complex modules can be combined to form units of greater complexity. A classic example of modularity is the Lunar Excursion Module (LEM) of the Apollo spacecraft, which detached from the main spacecraft to land on the moon, returning later to reunite with the main spacecraft. Nowhere did Darwin discuss modules. Darwin's idea was that complex things arise by an accumulation of countless tiny changes. Such an idea is very different from thinking that very complex organisms arise from a combination of modules. And complex organisms do not arise from a combination of independent modules. The organs of the human body are not at all independent of each other. Every organ in the body depends on the correct function of several other organs in the body, besides having additional bodily dependencies.

The claim the authors make of a liver existing "in relative independence" is untrue. A liver would shut down within a single day if either the heart or the lungs or the brain were removed (brains are necessary for the autonomic function of the heart and the lungs). The liver would not last more than a few weeks if the kidneys or the stomach were removed. Instead of being independent modules, the cells and organs of the body are gigantically interdependent. The existence of such massively interdependent objects in bodies (with so many cross-dependencies) makes it a million times harder for biologists to credibly explain biological origins, and makes a mockery of their boastful claims to understand such origins. So it is no surprise that biologists frequently resort to misleading statements denying or downplaying such massive interdependence, statements like the statement I quoted in italics above.

The diagram below gives us a hint of the cross-dependencies in biological systems, but fails to adequately represent them. A better diagram would be one in which there were fifty or more arrows indicating internal dependencies.



Very complex system, like many in machines and biological organisms. Dependencies may be far greater. Imagine many more such arrows, with some overlapping but pointing in opposite directions (like the chicken and the egg relying on each other).

Our authors have not even got apartment buildings right. I live in an apartment that is one of many in my building. My apartment is certainly not an independent module. It is dependent on the overall plumbing system and gas system and heating system and electrical system shared by the entire building.

The authors (Yuste and Levin) then discuss hierarchical organization. Hierarchical organization is certainly a very big aspect of physical human bodies. Subatomic particles are organized into atoms, which are organized into amino acids, which are organized into protein molecules, which are organized into protein complexes, which are organized into organelles, which are organized into cells, which are organized into tissues, which are organized into organs, which are organized into organ systems, which are organized into organisms. This is all the greatest embarrassment for today's biologists, who lack both a theory of the origin of hierarchical organization, and any theory at all of biological organization (Darwinism being a mere theory of accumulation, not a theory of organization).

Contrary to what our Scientific American authors insinuate, hierarchical organization is not a good description of minds. Our minds have no organization anything like the hierarchical organization of our bodies. So our authors err by suggesting hierarchical organization as some kind of "new clue" in understanding the origin of minds. Here is their vaporous reasoning with no real substance behind it:

"In biology, different organs could belong to the same body of an organism, whose goal would be to preserve itself and reproduce, and different organisms could belong to a community, like a beehive, whose goal would be to maintain a stable environment for its members. Similarly, the local metabolic and signaling goals of the cells integrate toward a morphogenetic outcome of building and repairing complex organs. Thus, increasingly sophisticated intelligence emerges from hierarchies of modules."

This is nothing remotely resembling a credible explanation for the origin of human minds that can do math and philosophy and abstract reasoning. The last sentence of the paragraph uses "thus" in a very inappropriate way, for none of the preceding talk explains how humans could get minds. Our minds are not "hierarchies of modules." Instead of being independent modules, different aspects of our minds are very much dependent on other aspects of our minds. Complex thought and language and memory and understanding are not independent modules. With very few exceptions, you cannot engage in complex thought without language and memory; and every time you use language you are relying on memory and understanding (your recall of the meaning of words); and you can't understand much of anything without using your memory.

Next our Scientific American authors speak in a not very helpful way, using the term "pattern completion" in a very strange way. Very oddly, they state this:

"A third step in our argument addresses this problem: each module has a few key elements that serve as control knobs or trigger points that activate the module. This is known as pattern completion, where the activation of a part of the system turns on the entire system."

Whatever the writers are talking about, it does nothing to explain minds. Yuste and Levin end by trying to cite some research dealing with this "pattern completion" effect they referred to. They cite only a paper that seems to be guilty of the same Questionable Research Practices that most neuroscience experiments are guilty of these days. It is a mouse experiment that used too-small study group sizes, such as study groups of 6 mice and 7 mice and 9 mice. The authors of the paper state, "We did not use a statistical power analysis to determine the number of animals used in each experiment beforehand." Such a confession is usually made when experimenters have used way-too-small sample sizes, using far fewer than the 15 subjects per study group recommended for robust results. The authors tell us "experimental data were collected not blinded to experimental groups," and makes no claim that any blinding protocol was used. The paper is therefore not robust evidence for anything supporting the claims of the authors of the Scientific American article. Because of its procedural defects, the paper provides no robust evidence for what Yuste and Levin claim, that "fascinating pattern-completion neurons activated small modules of cells that encoded visual perceptions, which were interpreted by the mouse as real objects." The only other paper cited by Yuste and Levin is a self-citation that has nothing to do with the origin of minds.

Instead of giving us any actual encouragement that scientists have "new clues" as to the origin of minds, the Scientific American article rather leaves us with the impression that mainstream scientists have no good clues about such a thing. You could postulate a credible theory about the origin of human minds, but the "old guard" editors of Scientific American would never publish it.

What is going on in Levin's latest Scientific American article is the same kind of inappropriate language that Levin abundantly used in a long article he co-authored with Daniel Dennett, one entitled "Cognition All the Way Down." In that article, Levin and Dennett use the word "cognition" and "agents" to refer to things like cells that have neither minds nor cognition. I don't think either Levin or Dennett actually believe that cells have minds or cognition. Their article reads like something a person might write if he did not believe that cells actually have minds and selves and thoughts, but if he merely thought that speaking as if cells are "agents" with "cognition" is a convenient rhetorical device. The Cambridge Dictionary defines cognition as "the use of conscious mental processes." The same dictonary defines an agent as "a person who acts for or represents another."

What seems to be going on is simply that words are being used in improper ways, like someone using the word "gift" to describe a bombing. It's just what we would expect from Darwinists, for improper language has always been at the center of Darwinism from its very beginning. At the heart of Darwinism is the misnomer phrase "natural selection," which refers to a mere survival-of-the-fittest effect that is not actually selection (the word "selection" refers to choice made by conscious agents). We should not be surprised that some thinkers who have for so long been talking about the selection-that-isn't-really-selection are now speaking about agents-that-aren't-really-agents and cognition-that-isn't-really-cognition and intelligence-that-isn't-really-intelligence.

at December 15, 2021 No comments:

Labels: origin of minds

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Head Truth

The huge case for thinking minds do not come from brains

Wednesday, December 8, 2021

The Biggest Brain Projects Are Still Failing to Support Prevailing Brain Dogmas

In a December 2020 post I examined the failure of the two biggest brain research projects to back up claims commonly made about the brain, such as the claim that the brain produces the mind and the claim that brains store memories. Let us now look at how one of those two biggest brain research programs (the Human Brain Project) is still failing to substantiate such claims. The Human Brain Project is a billion-dollar European research project.

The page here of the Human Brain Project web site is entitled "Highlights and Achievements," and presumably lists the biggest accomplishments of the Human Brain Project. Let's take a look at the items listed at the top of the page, in the year 2021 section. The first five items merely discuss technology innovations, not anything involving new findings about the brain. The sixth item is merely an interview with a professor who talks about no specific research findings of the Human Brain Project, and who says that the project has "become a truly enabling endeavor," which is the kind of vague praise that people give when they don't have much in the way of specific achievements to discuss. Then we have an item merely talking about how humans have some brain cell types not found in mice.

The next item is entitled "Controlling brain states with a ray of light." We have a statement of never-substantiated neuroscientist dogma: "The brain presents different states depending on the communication between billions of neurons, and this network is the basis of all our perceptions, memories, and behaviors." But the page discussing this ray of light research mentions nothing that sounds important. We merely hear of some light being sent into a brain, with some transition occurring, although the only transition claimed is an awakening from sleep: "This new chemically-engineered tool allowed to induce and investigate in detail, in a controlled and non-invasive way, the transitions of brain from sleep- to awake-like states using direct illumination." Not very impressive, given that we have already long known of a tool for inducing a transition from sleep to awake-like states: the humble alarm clock.

The next item merely mentions work on some robot. The item after that has the title "EBRAINS powers brain simulations to give insight into consciousness and its disorders." The page discussing this research mentions no progress in understanding how consciousness occurs. It merely mentions some project reading brain waves during normal consciousness and sleep. We have a quote making it sound as if unconsciousness always involves less complex brain waves:

Total Pageviews

112,491

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"We can see that unconsciousness is not simply a matter of a loss of brain activity," Massimini says. "It's not necessarily weaker. But it is a lot less complex."

This statement is only half-true. Brain waves are less complex for patients under anesthesia. But the most complex brain waves are those seen during grand mal seizures (also called tonic-clonic seizures), and during such seizures people are typically unconscious. An EEG reading during a grand mal seizures resembles a seismograph reading during an earthquake.

The next item is entitled "HBP-researchers find new approach for Energy-Efficient AI Applications," which obviously involves no progress in cognitive neuroscience**.** The item after that merely involves brain surgery, not cognitive neuroscience. The next item merely is something pertaining to spinal cord surgery.

We then see an item of little significance, merely something about some new technique for modeling dendrites. The item after that is the claim "A new means of neuronal communication discovered in the human brain." The claim is unjustified, being based solely on a paper failing to prevent robust evidence.

The paper is the paper "Long-range phase synchronization of high-frequency oscillations in human cortex." The claim of a synchronization effect is not well established. The paper looked for correlations after analyzing brain wave readings from fewer than 100 people. A paper like this would only be credible if (a) it was a pre-registered study that declared before any data was gathered a hypothesis to be tested, how the data would be gathered and how the data would be analyzed, and (b) the paper discussed a thorough blinding protocol that was followed. But there is no mention of any pre-registration of this study, and the paper never mentions any blinding protocol (failing to use the word "blind" in its text).

So what was going on? Apparently the authors got some EEG readings, and were then absolutely free to analyze the data in any way they wanted, being free to slice and dice the data until they found something they could call "synchronization." We should have very little confidence in a study following such a method. Given a body of data and freedom to analyze it any of 1001 ways, it is all too easy to find "synchronization" that is no real effect. For example, if I can compare the wins and losses of sports teams with the ups and downs of stock markets, options markets and bond markets, I could probably find a little something I could claim as "synchronization."

While the Human Brain Project site has bragged that "a new means of neuronal communication" has been discovered, the scientific paper behind this claim does not even sound very confident of such a thing, merely saying that some brain oscillations "may be synchronized between widely distributed brain regions." Also, neuron communication does not mean that neurons make our minds or store our memories.

The last item on the Human Brain Project's list of 2021 highlights is merely a discussion of some paper claiming similarities in the brains of birds and mammals. We read a claim that "the brains of birds and mammals look surprisingly similar in their organization." This is not at all true, and bird brains look very different from human brains.

Judging from the Human Brain Project's list of 2021 highlights, the lavishly funded Human Brain Project is not making any progress in verifying the main

- A Soul Might Explain Instincts, but DNA and Brains Cannot
- Five Hallmarks of an Information Storage System (None of Which Your Synapses Have)
- Your Physical Structure Did Not Arise Bottom-Up, So Why Think Your Mind Did?
- Why a "Mechanical Memory" Theory Does Not Work
- The Brain Seems to Have No Mechanism for Reading or Writing Memories
- No One Understands How a Brain Could Generate Ideas
- Prevailing Brain Dogmas Cannot Explain Hypnotic Phenomena
- 30 Reasons for Rejecting the Theory of Neural Memory Storage
- Common Experiences That Show the Untruth of Professorial Memory Claims
- Neuroscience Research Customs Guarantee an Abundance of Junk Science
- Groupthink and Peer Pressure Make It Taboo for Neuroscientists to Put Two and Two Together
- The Social Construction of Eager Community Mirages
- Preprint Server Counts Suggest Engrams Are Not Really Science
- Engrams Are Touted Like Phlogiston Was Once Touted
- Synaptic Delays Mean Brain Signals Must Move at a Snail's Pace
- Raven Smarts Defy Prevailing Brain Dogmas
- No One Can Credibly Explain Why a Brain Would Store a Memory in One Specific Spot
- Brain Dogmas Versus Case Histories That Refute Them
- Inaccurate Titles and Misleading Citations Are Common in Science Papers
- In Neuroscience Papers Bluffing Is More Common Than Candor
- Young Age of Languages Contradicts Claims of Neural Storage of Linguistic Information
- Vacillating Disarray of the Memory Trace Theorists
- Study Finds "Poor Overall Reliability" of Brain Scanning Studies
- "Brains Store Memories" Dogma Versus the Reality of Noisy Brains
- The Brain Has Nothing Like 7 Things a Computer Uses to Store and Retrieve Information

dogmas of cognitive neuroscientists, the claim that the brain is the source of the human mind, and the claim that brains store memories. Similarly, we find no support for such dogmas in a recent article entitled "The Human Brain Project: six achievements of Europe's largest neuroscience programme."

Here are the six achievments listed:

- **"Human brain atlas"**: We read about merely fancy descriptions of parts of the brain.
- **"Synapses in the hippocampus:"** We read that "researchers have published detailed 3D-maps of around 25,000 synapses – electrical and chemical signals between brain cells – in the human hippocampus." Such a result does not seem so impressive when you consider that the brain is believed to contain trillions of synapses. Also, you don't explain mental phenomena such as understanding and memory by making maps of synapses or maps of neurons.
- **"Robot hands"**: Obviously this has nothing to do with verifying the claims of cognitive neuroscientists.
- **"A neuro-inspired computer"**: The computer described is not anything like a computer having the characteristics of the brain. If you ever built such a computer, it would never work to process data reliably and at high speeds. In digital computers electrical signals travel with 100% reliability, but in the cortex of the brain a signal will only pass across a synapse with a likelihood of 50% or less. Computers have coordinate systems and indexing systems allowing the computer to instantly find the location of some stored data, but brains have no such things.
- **"Virtual epileptic patient"**: This has nothing to do with verifying the claims of cognitive neuroscientists.
- **"Scientific output"**: We merely hear a mention that 1497 papers cite the Human Brain Project.

In the year 2020 section of the "Highlights and Achievements" page of the Human Brain Project, you won't find anything that substantiates the main dogmas about brains taught by neuroscientists. My December 2020 post here discusses the items in that section (as well as the 2019, 2018 and 2017 sections), and explains why they fail to support claims such as the claim that brain make minds and the claim that brains store memories.

The Human Brain Project is making no progress in supporting claims such as the claim that brains make minds and the claim that brains store memories because such claims are not correct. But what about the other big brain project, the US-based BRAIN Initiative? In my December 2020 post I examined the failure of that project (as well as the Human Brain Project) to back up claims commonly made about the brain, such as the claim that the brain produces the mind and the claim that brains store memories. Were there any big results for the BRAIN Initiative in 2021?

Apparently not, judging from the page here which lists 2021 highlights for the BRAIN Initiative. There is some discussion of brain mapping that has not yet done anything to back up the main dogmas of neuroscience. We see only two stories relevant to whether brains make minds:

- A story entitled "Neuroprothesis restores words to man with paralysis."
- A story entitled "Reading Minds with Ultrasound: A Less-Invasive Technique to Decode the Brain's Intentions."

The first story discusses some man who had a stroke leading to brain stem damage causing him to lose the power of speech. Electrodes were planted in his head, to look for some correlation between motor cortex brain activity and attempts of the man to say one of 50 different words. A system was developed wherein the man's attempts to speak can be matched to one of the 50 words. This merely shows that the brain has a role in the muscle movements related to speech. It does not prove that the ideas for what to say arise from the brain.

The story about "reading minds with ultrasound" has a title that is misleading clickbait. The corresponding study was merely done with monkeys. What's going on is some obscure clear-as-mud business involving trying to predict which of two options (left or right) a monkey will take, based on reading brain states a few seconds before the movement. A good rule of thumb for experimental science is to ignore all studies that did not use at least 15 subjects per study group. The main results for this study involve experiments on only a single monkey. The study (which shows no sign of using a blinding protocol) is not reliable evidence for any ability to read minds with ultrasound.

It appears that neither the Human Brain Project in Europe nor the BRAIN Initiative in the US is making progress in supporting claims such as the claim that brains make minds and the claim that brains store memories. Such progress will never be made because the brain is not the source of our mind, and our brains do not store memories. To find reasons justifying these statements, read the other posts on this blog.

In today's science news, we have the results of a project to test the reproducibility of cancer research. A paper reports little success in reproducing results. We hear that a large fraction of scientists simply refused to respond to queries from fellow scientists trying to reproduce the results, which is just what we would expect if a significant fraction of published research was fraudulent or defective. Here is a very worrying quote from the abstract:

"We conducted the Reproducibility Project: Cancer Biology to investigate the replicability of preclinical research in cancer biology....However, the various barriers and challenges we encountered while designing and conducting the experiments meant that we were only able to repeat 50 experiments from 23

papers. Here we report these barriers and challenges. First, many original papers failed to report key descriptive and inferential statistics: the data needed to compute effect sizes and conduct power analyses was publicly accessible for just 4 of 193 experiments. Moreover, despite contacting the authors of the original papers, we were unable to obtain these data for 68% of the experiments. Second, none of the 193 experiments were described in sufficient detail in the original paper to enable us to design protocols to repeat the experiments, so we had to seek clarifications from the original authors. While authors were extremely or very helpful for 41% of experiments, they were minimally helpful for 9% of experiments, and not at all helpful (or did not respond to us) for 32% of experiments."

Can you imagine a more damning statistic about the work quality of today's biological researchers, the fact that "none of the 193 experiments were described in sufficient detail in the original paper to enable us to design protocols to repeat the experiments"?

In a separate paper, the researchers found that "the median effect size in the replications was 85% smaller than the median effect size in the original experiments, and 92% of replication effect sizes were smaller than the original," which suggests a high degree of unreliability in biomedical research.

at December 08, 2021 No comments:

Labels: brain research projects, replication crisis

Wednesday, December 1, 2021

Way Off in Their Predictions, Neuroscientists Keep Misdescribing Human Memory Performance

In the posts of this blog I have given very many reasons for thinking that the statements of neuroscientists about a brain storage of memories are just plain false. Contrary to the constant claims of neuroscientists that brains store memories, the brain bears no resemblance to a device for storing memories. There is nothing in the brain that resembles some component for storing learned information, and nothing in the brain the resembles some component for reading stored memory information. The place that neuroscientists usually claim as a storage place for memories (synapses) are places of great instability and turnover that cannot possibly be a storage place for human memories that can last for 50 years or longer.

Humans are able to recall detailed memories instantly, upon hearing a name or seeing an image. The brain has no features that can account for such instant recall. Humans know from their work with computers the type of things a device needs to have to be able to instantly recall stored information: things such as an addressing system or a position notation system, and things such as indexes. The brain has no such thing. Retrieving a memory from a brain would be like trying to get just the right index card (the one and only card storing some data) from a large swimming pool filled with index cards. Moreover, the low reliability of synaptic transmission and the very high noise levels in brains should make it impossible for anyone to accurately retrieve large bodies of information from a brain. Conversely, we know that humans can flawlessly retrieve very large bodies of information, such as when Hamlet actors or Wagnerian tenors accurately perform very long roles without an error, and when certain Muslim scholars recite their whole holy book without error.

Besides such reasons, we have an entirely different reason for thinking that neuroscientists are in their own little fantasy world when it comes to human memory. This is the reason that neuroscientists again and again misdescribe human memory performance and also make very poor predictions about human memory performance.

We have an example of such misdescribing in a recent article on the online Nautilus magazine, written by the neuroscientist Anil Seth. Entitled "We Are Beast Machines," we have some dehumanizing nonsense talk in which almost everything is an oracular dogmatic proclamation provided without any supporting evidence. Before stating very absurd drivel telling us "all of our perceptions and experiences, whether of the self or of the world, are inside-out controlled and controlling hallucinations," Seth recalls some early memory and states, "I must have been about 8 or 9 years old, and like all early memories this one too is unreliable." Here we have a claim that early memories are unreliable. But the claim has been refuted by studies.

For example, in the paper "Early childhood memories: accuracy and effect," we read that very early childhood memories tend to be accurate:

"Subjects were asked to report the earliest memories of their lives. Where possible, the memory protocols were submitted to adults present at the time of the original episode for possible confirmation. The majority of memories were characterized by distinct emotion, with a higher count of negative than of positive emotion. The majority of memories proved accurate, with confirmation operating at as high a level in the case of positive or emotionally neutral memories as of negative memories. General memory content showed no differential patterns across negative and positive memories. Thus claims that infantile memories are powered uniquely by trauma, and/or routinely include distortions, were not supported."

In Scientific American we read that neuroscientists were not even in the right ballpark when asked to estimate how reliably people would remember things:

"Even memory experts can struggle to predict how accurate our recollections are. In a recent study at the University of Toronto, such experts were asked to predict the accuracy of memories of events that happened two days earlier. While recollections of these events were very good—more than 90 percent correct on average—the experts predicted they would be only 40 percent correct."

So our neuroscientists have a false idea that humans can't remember things well after two days, an idea totally contrary to human memory performance reality. It's easy to understand why they would make errors of this type. All the low-level facts we have learned about the brain defy the idea of very good and fast memory performance by neural means. So neuroscientists tend to (1) ignore or deny cases of very high-performance memory; (2) portray human memory as much slower and less reliable than it is.

Another way in which neuroscientists misdescribe human memory performance is their continued teaching of an utterly false doctrine that humans take quite a while to form new memories, many minutes or even hours. The reality is that humans are constantly forming new memories instantly.

There are a hundred ways to prove the reality of instant human memory creation. The following thought experiment will suffice. Imagine you are watching a movie at home and you see on your TV screen the words "The End." Now suppose a friend with you then immediately asks: "How did the movie end?" You will be able to correctly answer the question, because you have instantly formed a new memory of the movie's ending. You will not need to tell your friend, "Give me twenty minutes for my memory of the ending to finish forming, and I will tell you the ending."

Why do neuroscientists keep teaching this very silly idea that memories take many minutes or hours to form, an idea so gigantically contrary to human experience? It has to do with the incorrect idea they have about how memories form. Most neuroscientists claim that memories form from a strengthening of synapses. It's an idea that makes no sense. We have no known case of information ever being stored through some act of strengthening. The imagined strengthening is something that would take many minutes, because of a need for protein synthesis that occurs at a sluggish pace. Having wed themselves to this extremely silly idea, neuroscientists are forced to deny one of the most obvious facts of human existence, that people can form new memories instantly.

Neuroscientists also misdescribe human memory performance when they try to insinuate that permanent new memories required repeated exposures to a sensory stimulus. This is certainly false. Let's go back to the example of watching the movie. What happens if the movie is shown again on TV six months from now? Unless you particularly enjoyed the movie, you will probably decide not to watch it again. Why? Because you remember what happened in the movie, after seeing it only once. A large fraction of the things that you remember are things that you saw or heard or were taught only a single time.

Another way in which neuroscientists misdescribe human memory performance is by sometimes denying types of exceptional memory skills. For example, like many articles written by neuroscientists, a New Scientist article states this:

"Photographic memory is the ability to recall a past scene in detail with great accuracy – just like a photograph. Although many people claim that they have it, we still don't have proof that it actually exists."

Oh really? So why does a very technical 2019 scientific paper matter-of-factly refer to "a 13-year-old autistic boy with a photographic memory and speech-language deficit"? And how come Stephen Wiltshire has repeatedly shown the ability to accurately draw skylines he has only seen once? Many children have photographic memory, and neuroscientists are splitting hairs when they try to distinguish between photographic memory and what they call "eidetic" memory, which means basically the same thing.

In his book *Thought and Choice in Chess*, Adriaan D. de Groot presented data showing photographic memory in adult grand masters. For example, one of them was able to perfectly reproduce from memory the chess position shown below (page 326), after being shown the board for less than 15 seconds (page 322-323):

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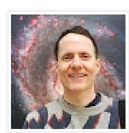

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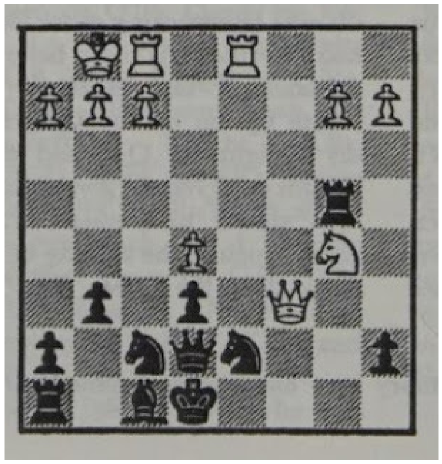

In the paper here, we read that in 1894 Binet sent out questionnaires to chess masters, asking them how they remembered chess positions. The masters "almost invariably reported having the chess board stored as a visual image, like a photograph."

A scientific paper reports the following, which contradicts the typical neuroscientist talk about the weakness of memory:

"Overall our results demonstrate the impressive nature of visual long-term memory fidelity, which we find is even higher fidelity than previously indicated in situations involving repetitions. Furthermore, our results suggest that there is no distinction between the fidelity of visual working memory and visual long-term memory, but instead both memory systems are capable of storing similar incredibly high fidelity memories under the right circumstances."

at December 01, 2021 No comments:

Labels: exceptional memory

Sunday, November 21, 2021

Just Call Them "Machine-Metaphor-Misguided"

A recent interview on the website www.vox.com inadvertently gives us a portrait of the scrambled thinking of modern neuroscientists, whose thinking about the brain is senselessly guided not by the low-level characteristics of the brain discovered by neuroscientists, but by silly mechanical metaphors in which the non-mechanical brain is constantly compared to machines invented by men. The article containing the interview begins with the statement, "It's difficult to talk about the human brain without inadvertently talking about computers." No, that isn't true.

The interview is with a zoologist named Matthew Cobb, who has written about the history of ideas about the brain. Cobb had some insightful and intelligent-sounding things to say about the improbability of eukaryotic cells evolving, which I quoted in a 2017 post. But in this interview his answers are empty-sounding.

Cobb makes it sound like scientists have a history of comparing the brain to whatever is the most impressive communications technology available in a particular time. So when the telegraph was the latest and greatest in communication technology (around 1850), the brain was compared to a telegraph; and when telephone technology was the latest and greatest in communication technology (in the early twentieth century), the brain was compared to a telephone switchboard; and when computers and Internet-capable devices were the latest and greatest in communications technology, the brain was compared to a computer.

None of these metaphors ever made sense. Telegraph systems, telephone systems and computer systems all are based on the signal transmission in copper wires that transmit signals with near-100% reliability. The chemical synapses in the brain that are by far the most common type of synapses have no such reliability. Tests have shown that in a chemical synapse the probability of successful transmission is less than 50%.

In an interview, an expert on neuron noise states the following:

"There is, for example, unreliable synaptic transmission. This is something that an engineer would not normally build into a system. When one neuron is active, and a signal runs down the axon, that signal is not guaranteed to actually reach the next neuron. It makes it across the synapse with a probability like one half, or even less. This introduces a lot of noise into the system."

So according to this expert, synapses (the supposed storage place of human memories) transmit signals with a probability of less than 50 percent. That's very heavy noise – the kind of noise you would have if half of the characters in your text messages got scrambled by your cell phone carrier. A scientific paper tells us the same thing. It states, "Several recent studies have documented the unreliability of central nervous system synapses: typically, a postsynaptic response is produced less than half of the time when a presynaptic nerve impulse arrives at a synapse." Another scientific paper says, "In the cortex, individual synapses seem to be extremely unreliable: the probability of transmitter release in response to a single action potential can be as low as 0.1 or lower."

Another reason it never made sense to compare the brain to a telegraph system is that telegraph systems are based on a particular signal transmission code (the Morse Code) invented by Samuel Morse; but no one has ever discovered any evidence of any code system in the brain by which complex learned information can be reliably transmitted or stored or retrieved. No one has ever discovered a "brain code" or a "neuron code" analagous to the Morse Code.

It also never made any sense to compare the brain to a telephone switchboard. In an old-fashioned telephone switchboard, a caller would be routed exclusively to one particular telephone number. For example, a switchboard operator (after getting a request) might cause the caller with the number 342-2352 to be exclusively routed so that one and one phone number would ring: the number 342-4252. But the brain does not work like that. Most neurons are connected to very many other neurons. A scientific paper tells us, "Each neuron may be connected to up to 10,000 other neurons, passing signals to each other via as many as 1,000 trillion synapses."

This is actually an extremely strong reason for rejecting all claims that memory recall occurs in brains or that memories are stored in brains or that brains produce thinking. In my long post here I discuss this point at great length. I'll give just a short summary of my reasoning: reliable signal transmission only occurs when there is an exclusive or near-exclusive relation between a receiver and a transmission source. That's why TV sets never receive ten channels at

Labels

the same time. When a receiver is bombarded by signals from very many sources at the same time, it would be like a TV that is simultaneously getting broadcasts from very many TV channels. The result would be an unintelligible jumble kind of like the mess shown in the visual below:

A jumble rather like the one above is something we should expect from a brain in which each neuron is always getting signals from very many other neurons, except that the jumble and unintelligibilty would be far worse; for most neurons receive signals from very many other neurons.

But what about the modern-day "brain as computer" metaphor? It never made any sense. To understand why, just read my post entitled "The Brain Has Nothing Like 7 Things a Computer Uses to Store and Retrieve Information." Below are the things I mentioned, things that are crucial components of computers, but have no counterpart in the brain:

- An Operating System
- An Application to Store and Retrieve Data
- The ASCII Code for Encoding Information
- A Decimal to Binary Conversion Table or Utility
- A Medium That Allows a Permanent, Stable Storage of Information
- A Storage Location System by Which the Exact Position of a Data Item Can be Specified, Allowing Fast Retrieval from an Exact Location
- Read/Write Functionality Allowing Data to Be Written to a Specific Location and Also Read From the Same Location

Asked about when scientists first started assuming that thinking comes from the brain, we get a very revealing answer from Cobb, an answer that inadvertently reveals the lack of any sound foundation for such an idea. The answer is a minor classic of empty insubstantiality. Here is Cobb's answer about when scientists first started assuming that thinking comes from the brain:

"Not in one moment. You mustn't get the idea that somebody suddenly did an experiment and said, 'Aha!' Instead, there's this slow accumulation of certainty. First, there's anatomical demonstration that the 'viscera' like the heart have other functions. The heart is a pump, which was demonstrated at the beginning of the 17th century — so it doesn't have the wherewithal to do the mysterious business associated with perception and thinking and so on. On the other hand, the brain, as anatomical studies showed, has got all these neurons, and it's connected by the neurons to all the sense organs and

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
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- recommended books
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- replication crisis
- savants
- science journalism

everything else. So gradually, in the course of the 17th century in particular, people became increasingly confident that it was the brain that was doing thinking. How it did it, they weren't quite sure."

Cobb confesses that there was never any experiment that caused scientists to assume that brains think. He suggests that showing that hearts probably don't think was some reason for thinking that brains think, which makes no sense at all. You do not show that one organ does something by showing that some other organ does not do that thing. The fact that neurons are connected to sense organs does nothing to show that brains cause thinking. The phrase "slow accumulation of certainty" is very misleading. There has never been any certainty that brains think, nor any sound basis for believing that they do think.

To the contrary, there are the strongest reasons for thinking that brains cannot possibly be the cause of lightning-fast human thinking. They include the following:

- The fact that no one has the slightest idea of how any arrangement of neurons could ever cause the arising of abstract ideas. Cobb's claim that neuroscientists aren't quite sure of how a brain could think is misleading. The truth is they haven't the slightest credible idea of how such a thing could occur.
- The fact that severe slowing factors should make it impossible for brains to produce the lightning fast thinking that occurs in people such as math savants who can produce very complex calculations with astonishing speed.
- The fact that unreliable synaptic transmission (discussed above) should make accurate memory recall and very accurate thinking impossible, contrary to the reality that humans such as Hamlet actors can recall large bodies of text with perfect accuracy, and other humans can do very complex mental calculations "in their head" with perfect accuracy.

An extremely important point about human thinking is that some people are capable of doing very complex thinking with blazing speed and perfect accuracy. The natural limitations of the brain (very heavy signal noise, many internal slowing factors, and unreliable synapse transmission) rule out the brain as a source of such phenomena. An example of such a person is Neelakantha Bhanu Prakash, called "the world's fastest calculator." He can do things such as accurately multiply 869,463,853 times 73 in just 20 seconds. This is despite the fact that he had a very bad brain injury in a motorcycle crash, an injury to the front of his head so bad it required 85 stitches, multiple operations and a medically induced coma to treat. He still has a prominent scar on his forehead as a reminder of the accident.

Later in the interview discussed above, Cobb makes this very misleading statement comparing brain wiring to undersea transatlantic cables:

"They looked, for example, at the structure of undersea cables that were carrying telegraph messages across the Atlantic, and they could see that there was a central core of copper and then around it was insulation. And then they looked at neurons, at nerves, and they said, 'Well, this is exactly the same.' "

Many readers probably read that statement and thought: "Gee, I didn't know there are copper wires inside the brain." There are no such things. There are what are called myelinated axons in the brain that transmit signals quickly. But in the grey matter cortex of the brain the great majority of axons are not well myelinated. A scientific text co-written by a Yale scientist says this:

"The axons of grey matter are not heavily myelinated, unlike white matter, which contains a high concentration of myelin. The grey matter contains the majority of neuron somas, making it appear tan with circulation but grey when prepared for examination outside of the body. These somas are circular structures that house the nucleus of the cells."

Besides the lack of myelination in the grey matter of the brain, there's a crucial reason why the "transatlantic cable" analogy is profoundly misleading. The 1866 transatlantic cable was capable of transmitting eight words per minute across the Atlantic ocean, because of a lack of any "speed bumps" that would slow down the signal. In the cortex there are "speed bumps" all over the place. They include the following:

(1) The speed of transmission through dendrites, which can be 200 or more times slower than the "100 meters per second" estimate based on transmission through well-myelinated axons. According to one expert, dendrites make up 90% of neural tissue.
(2) Synaptic delays, each about .5 millisecond, which end up being a huge slowing factor because so very many synapses must be traversed to pass through a decent amount of cortex tissue.
(3) Synaptic unreliability or noise, the fact that a signal across a synapse is typically transmitted with only between 10% to 50% likelihood, a factor that is typically ignored but which has a huge impact on effective speed.
(4) Synaptic fatigue, the fact that a synapse will so often need a rest period after firing, a period that can be more than a minute.
(5) Tortuosity, the fact that nerve signals must travel through sinuous paths that are not straight lines.
(6) Folding of cortex tissue, a further slowing factor.
(7) Low myelination in the cortex, where the gray matter has little myelination.

Every one of these factors is ignored by 95% of discussions of brain signal speed in the popular press. Altogether these factors should cause us to conclude that the brain cannot possibly be the source of very fast recall and very fast thinking in people such as mathematical savants.

After discussing how brains were first compared to telegraph systems and then compared to telephone systems, Cobb is asked "what came after the telephone?" He describes the latest silly machine metaphor, whose silliness he fails to perceive:

"Well, the dominant metaphor is that the brain is something like a computer. It's carrying out some kind of calculations. And that idea, which came into being in the 1940s and early 1950s, still dominates over 70 years on."

To see why this metaphor makes no sense, read my post entitled "The Brain Has Nothing Like 7 Things a Computer Uses to Store and Retrieve

Information." Among the reasons why it is senseless to claim that brains make minds and brains are like computers, some additional reasons are:

- Minds are conscious, and computers are not.
- Minds can have novel abstract ideas, and computers cannot.
- Minds can have curiosity and morality, but computers cannot.
- Minds have experience and feelings, and computers do not.
- Minds can be interested in things, but computers cannot.
- Minds can experience pleasure and pain, but computers cannot.

A very general question that we should be asking again and again to scientists is: "What forced you to believe that?" When there is a good evidence basis for thinking something, scientists will be able to discuss some evidence that forced them to believe some particular thing, regardless of whether they wanted to. There is nothing at all that forced scientists to believe that brains produce thinking. They simply adopted such a belief because they didn't want to believe in souls or because they wanted to say they had an answer to a deep question they did not understand. The lack of any good evidence basis for believing that brains produce thinking is suggested by the very wobbly "not in one moment" answer given by Cobb quoted above.

Neuroscientists should not be asking, "What machine created by humans should we compare the brain to?" Instead, neuroscientists should be asking, "What low-level facts that we have learned about the brain should cause us to reduce and limit our ideas about what the brain could be capable of?" Above I have listed many such facts, senselessly ignored by neuroscientists. There are many other such facts mentioned in other posts on this blog.

at November 21, 2021 3 comments:

Labels: "brain as computer" metaphor, brain signal speed, savants

Saturday, November 13, 2021

Seeing Only Synaptic Instability and Variability, They Misleadingly Call It "Synaptic Plasticity"

Some of the terms most often used by biologists are misleading terms. Perhaps the biggest example is the term "natural selection." Selection is a term meaning a choice by a conscious agent. The so-called "natural selection" imagined by those who use such a term does not actually involve any selection or choice. The "natural selection" imagined by biologists merely involves a survival-of-the-fittest effect, in which fitter organisms survive longer or reproduce more. The duplicity of using the term "natural selection" for some imagined effect that is not actually selection is a word trick that was started by Charles Darwin, who coined the term "natural selection."

Then there is the term "body plan." To the average person this sounds like a plan for building the body of an organism. But biologists routinely use the term "body plan" to mean something much, much less: merely the features common to all the organisms that make up a phylum. According to such a definition, all species in the Chordata phylum (including humans, bears, dogs and fish) have the same body plan, which consists of little more than a backbone and a tendency towards bilateral symmetry (having the same features on the left and right side). With such a definition of "body plan," biologists can make very misleading statements that fool us into thinking they know far more than they do. Biologists may say that they know how humans got their body plan, and by "body plan" mean little more than a backbone-based body structure. 90% of the people hearing such a boast about a body plan will misunderstand, and think that such biologists are claiming that they know how the incredibly organized human structure arises from a vastly less organized speck-sized egg (something biologists do not actually know, largely because DNA does not specify anatomy).

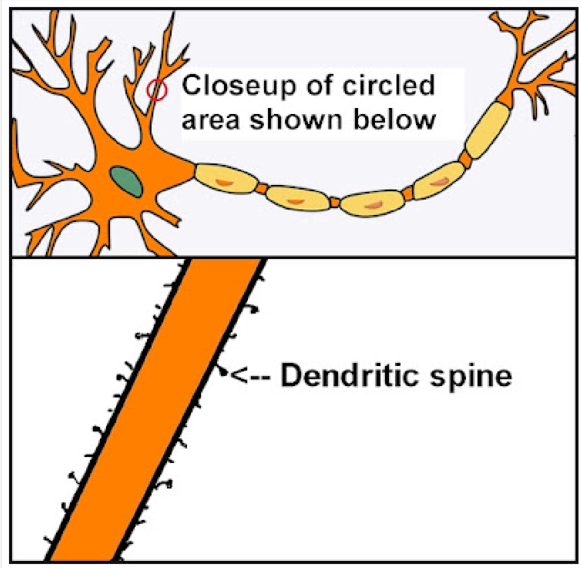
Then there is the term "long-term potentiation." What is misleadingly called “long-term potentiation” or LTP is a not-very-long-lasting effect by which certain types of high-frequency stimulation (such as stimulation by electrodes) produces an increase in synaptic strength. The problem is that so-called long-term potentiation is actually a very *short-term* phenomenon. A 2013 paper states that so-called long-term potentiation is really very short-lived:

"LTP always decays and usually does so rapidly. Its rate of decay is measured in hours or days (for review, see Abraham 2003). Even with extended 'training,' a decay to baseline levels is observed within days to a week."

So-called long-term potentiation is no more long-term than a suntan. The use of the term "long-term potentiation" for such an effect is deceptive, particularly when it is suggested that so-called "long-term potentiation" might have something to do with explaining memories that can last for 50 years or longer.

Another very misleading term used by biologists is the term "synaptic plasticity." To explain why the term is misleading, let me look at what has been observed regarding synapses and dendritic spines: something that is merely instability and high variability.

As a general rule, individual synapses are too small to be well-observed in large numbers by scientific equipment. By using equipment such as electron microscopes, scientists can zoom in on one or a few synapses. But with so many billions of synapses in the brain it is effectively impossible to reliably determine whether synapses are responding to some sensory input or learning experience. Easier than observing individual synapses is the task of observing what are called dendritic spines. Dendritic spines are little bumps on dendrites. In the visual below, the bottom part shows a closeup of the tiny red circle in the top part.



The dendritic spines have a close relation to synapses, because synapses are typically found clustered around such dendritic spines.

What do scientists see when observing such dendritic spines? They see them very slowly appearing and disappearing, and very slowly randomly changing in size. Dendritic spines are rather like pimples on the face of a teenager with acne, pimples that slowly come and go, increasing or decreasing in size. The correct word to describe such constant changes in all dendritic spines is *variability*, not plasticity. There is no evidence of such dendritic spines changing in some systematic way, some kind of way suggesting information storage. There is no robust evidence that any dendritic spines have ever changed in some way that correlates with learning or memory formation.

There are two terms in the English language that correctly describe what we observe in dendritic spines and synapses. The words are "instability" and "variability." But neuroscientists don't like to use those words when talking about synapses. Instead, they prefer to use the term "synaptic plasticity." Such a term is very misleading.

When I do a Google search for "plasticity definition," the first result I get gives me a definition of "the quality of being easily shaped or modified." The Merriam-Webster online dictionary gives two definitions of "plasticity":

1. The quality or state of being plastic *especially*: capacity for being molded or altered.
2. The ability to retain a shape attained by pressure deformation.

It is rather clear what the intention was when scientists first started using the term "synaptic plasticity." The intention was to bring to mind the idea of synapses being like clay in which memories can be written. Used by the Babylonians who used cuneiform, writing in clay was one of the oldest methods used by humans to record information. Clay had two great advantages: (1) a person using a metal stylus could instantly write letters on clay; (2) clay could permanently store letters written on it.

There are two reasons why it is very misleading to be using the term "synaptic plasticity." The first is that no one has ever observed any effect in which synapses quickly take on some particular shape or pattern in response to some causal factor. Nothing like any molding or shaping effect has ever been observed.

The second reason is that term "plasticity" implies the retention of some pattern that was produced by a shaping or molding effect. The second Merriam-Webster definition of plasticity is "the ability to retain a shape attained by pressure deformation." What we observe in dendritic spines and synapses is such a high level of variability and instability that there is every reason to doubt that they could be capable of retaining any pattern if such a pattern were ever to be impressed on them.

Dendritic spines last no more than a few months in the hippocampus, and less than two years in the cortex. This study found that dendritic spines in the hippocampus last for only about 30 days. This study found that dendritic spines in the hippocampus have a turnover of about 40% each 4 days. This study found that dendritic spines in the cortex of mice brains have a half-life of only 120 days. The wikipedia article on dendritic spines says, "Spine number is very variable and spines come and go; in a matter of hours, 10-20% of spines can spontaneously appear or disappear on the pyramidal cells of the cerebral cortex." Referring to i*n vivo* observations of dendritic spines in the mouse hippocampus, the paper here says the authors "measured a spine turnover of ~40% within 4 days." The 2017 paper here ("Long-term in vivo imaging of experience-dependent synaptic plasticity in adult cortex") found the following regarding dendritic spines in the cortex of rodents:

"About 80% of synapses were detectable for a day or longer; about 60% belonged to the stable pool imaged for at least 8 days. Even this stable pool was found to turn over, with only, 50% of spines surviving for 30 days or longer. Assuming stochastic behaviour, we estimate that the mean lifetime of the stable pool would be on the order of 120 days."

The paper here states, *"*Experiments indicate in absence of activity average life times ranging from minutes for immature synapses to two months for mature ones with large weights."

We have no good evidence that any dendritic spines survive for more than a few years. There is an often-cited paper from the year 2000 with the title "Stably maintained dendritic spines are associated with lifelong memories." The title is misleading, like the title of so many scientific papers. The paper actually found that "a tiny fraction of daily formed new spines (~0.2% of the total spines) could persist for 3–5 months." So the paper found that only 1 in 500 dendritic spines persist for as long as 5 months. The paper resorts to some dubious math to try to hypothesize that some dendritic spines may last for years.

More recent papers have made even more clear the high turnover rate of dendritic spines, and have made it seem less likely that any dendritic spines survive for more than a few years. The 2015 paper "Impermanence of dendritic spines in live adult CA1 hippocampus" states the following, describing a 100% turnover of dendritic spines within six weeks:

"Mathematical modeling revealed that the data best matched kinetic models with a single population of spines of mean lifetime ~1–2 weeks. This implies

~100% turnover in ~2–3 times this interval, a near full erasure of the synaptic connectivity pattern."

The paper here states, "It has been shown that in the hippocampus in vivo, within a month the rate of spine turnover approaches 100% (Attardo et al., 2015; Pfeiffer et al., 2018)." The 2020 paper here states, "Only a tiny fraction of new spines (0.04% of total spines) survive the first few weeks in synaptic circuits and are stably maintained later in life." The author here is telling us that only 1 in 2500 dendritic spines survive more than a few weeks. Given such an assertion, we should be very skeptical about the author's insinuation that some very tiny fraction of such spines "are stably maintained." No one has ever observed a dendritic spine lasting for years, and the observations that have been made of dendritic spines give us every reason to assume that dendritic spines do not ever last for more than a few years.

The same studies that show such short lifetimes for dendritic spines show that while they exist, dendritic spines very rarely maintain the same size and shape. During their short lifetimes, dendritic spines tend to change very much in size and shape.

So dendritic spines and synapses are unstable and highly variable things, and there is no evidence that they can retain some pattern that might be impressed on them. There is no evidence that dendritic spines or synapses quickly change in respond to something an organism has learned or experienced. There is zero robust evidence of any kind of code used by which information is imprinted on dendritic spines or synapses. We know that the proteins in such dendritic spines and synapses are very short-lived, having average lifetimes of less than two weeks. While we can honestly refer to synaptic instability and synaptic variability, we have no observational warrant for using the phrase "synaptic plasticity."

This confusion in which mere variability is incorrectly described as plasticity is shown in the Wikipedia.org article on dendritic spines, where we read this: "Dendritic spines are very 'plastic', that is, spines change significantly in shape, volume, and number in small time courses." Such random changes will be seen in any group of dendritic spines observed, and they are correctly described as "variability" rather than "plasticity." Rather than stating that dendritic spines or synapses are "plastic" (a claim for which there is no robust evidence), we should merely be saying that dendritic spines and synapses are variable and unstable. We have good evidence that dendritic spines are constantly undergoing random changes. We have no good evidence that such changes are any type of "plasticity" shaping or molding effect produced by sensory experience or learning.

What often goes on in neuroscience literature is a very careless confusion between variability and plasticity. Variability refers to something that undergoes random changes. Plasticity refers to some effect in which something molds or shapes in response to the action of something acting like a molder or shaper. We have lots of evidence for the constant variability of synapses and dendritic spines. We have no good evidence for plasticity occurring in such things. Similarly, we have very good evidence for variability in the sky above our heads, which constantly undergoes changes as different clouds drift by. We have no evidence for plasticity in the sky above our heads.

There have been studies that have claimed to provide evidence for synaptic plasticity in the sense of synapses changing in response to some experience, but such studies have provided no actual robust evidence backing up such claims. In a typical study of this type some animal will be given some sensory experience or learning experience, and then some dendritic spines or synapses will be watched. The paper may claim that some increases in dendritic spines or synapses were observed, and that this is evidence that such things were responding to the sensory experience or learning experience. The flaw in such reasoning is obvious. Since a mouse has something like a trillion synapses and very many billions of dendritic spines, which tend to undergo random changes, there is no reason to think that some small group of dendritic spines or synapses chosen for study would be exactly the right dendritic spines or synapses that might be responding to some sensory input or learning experience. It would be far more likely that some dendritic spines or synapses chosen for study would have no connection at all to some sensory experience or learning experience, and that any change observed would be mere random variation.

Part of the problem is the enormous number of synapses. Humans have something like 100 trillion synapses, and even mice have a trillion synapses. So it is impossible to do some experiment that observes something like a molding or shaping effect in which synapses take some particular shape or configuration in response to some sensory input or learning experience. Even if you were to do some *in vivo* experiment in which you saw some synapses change just after a learning experience or sensory experience, you would have no way of knowing whether such a change was just a random change that would have occurred even if the learning experience or sensory experience had not occurred.

Given a brain in which there are something like a trillion synapses and dendritic spines which are undergoing random changes, like pimples on the face of a teenager with acne, you absolutely do not show an effect of plasticity (synapses or dendritic spines changing in response to a learning or sensory experience) by showing that some small number of synapses or dendritic spines increased in size or strength after something was learned. We would expect that perhaps 25% of any randomly selected dendritic spines or synapses would increase after some learning occurred, even if this was in no way produced by learning or sensory experience. Similarly, if I claimed that stocks sometimes rise in response to what I write, I would provide no robust evidence for such a claim by showing that five or ten stocks had risen in value on some day I wrote something. At least a quarter of all stocks will increase in value on a random day.

A 2021 scientific paper gives us a sentence of unproven dogma, followed by another sentence confessing the lack of observations to support such a dogma:

"A defining feature of the brain is the ability of its synaptic contacts to adapt structurally and functionally in an experience-dependent manner. In the human cortex, however, direct experimental evidence for coordinated structural and functional synaptic adaptation is currently lacking."

Or to put it more concisely, there's no good evidence for synaptic plasticity, in the sense of synapses molding in response to something learned or experienced. Scientists looking for evidence of memories forming in the brain are still empty-handed, although their misleading words often suggest otherwise. Another recent paper kind of gives us a hint that "there's no there there" by saying at its beginning, "After decades of research on memory formation and retention, we are still searching for the definite concept and process behind neuroplasticity," which has a "still grasping for moonbeams" sound to it.

at November 13, 2021 No comments:

Labels: memory storage, synapse theory of memory, synaptic plasticity

Thursday, November 4, 2021

He's Strangely Seeking Memories in Cells Below the Neck

Psychiatrist Thomas R. Verny has written a very interesting article entitled "Enduring Memory." Below the title we read the line "How can animals whose brains have been drastically remodelled still recall their kin, their traumas and their skills?"

In the first sentence of the article Verny mentions a concept he calls "cellular memory," and which he defines as "the idea that memory can be stored outside the brain, in all the body's cells." This is an idea that is completely contrary to what our scientists have been teaching for many decades, that memories are stored in the brain. The term "cellular memory" is a poor term for such a concept, since anyone hearing such a term would think of memory being stored in brain cells. A better term for such an idea would be "below-the-neck cellular memory."

Verny discusses some reasons for rejecting claims that memories are stored only in the brain. He mentions the case of a French civil servant who was found to have only a thin sheet of brain tissue, since almost all of his brain had been gradually replaced by a watery fluid. He fails to give us a link to the original story, which can be read here. By following that link you can see photos that show how almost-empty the brain was of that person with an IQ of 75.

Verney discussed other similar cases. He states, "Following hemispherectomy – where half the brain can be removed to control seizures – most children showed not only an improvement in their intellectual capacity and sociability but also their apparent retention of memory, personality and sense of humour." By reading my post here, you can read many specifics about such cases, including papers giving IQ scores before and after removal of half of a brain, showing little change. The details given in that post back up the claim of Verney I just quoted. Verney fails to mention the cases documented by the physician John Lorber, who showed that quite a few patients with much less than half of a brain had above-average intelligence.

Verney then makes a statement that makes no sense. He states, "If people who lack a large part of their brain can function normally, or even relatively normally, then there must exist, I thought, some kind of back-up system that can kick in when the primary system crashes." The phrase he should have been using in such reasoning is "half of their brain or most of their brain," since we know from hemispherectomy operations and hydrocephalus cases that people can function relatively normally when half or most of their brain is lost.

There is no warrant from the cases discussed above for the idea that there exists some "back-up system" that "can kick in" when half or most of the brain is lost, replacing function that was previously carried out by the brain. Instead, the evidence discussed above should cause us to conclude that the brain is not the source of our intellectual functions and is not the storage place of our memories. Such cases support the idea that human memory and human cognition are aspects of a human soul or spirit rather than products of the brain or any other physical part of the body. Just as there is nothing in the brain that bears any resemblance to a system for storing and retrieving memories, there is nothing below the neck that bears any resemblance to a system for storing and retrieving memories.

Without doing anything to substantiate his speculation about memories stored below the neck, Verny then goes into a discussion of evidence that animals can maintain memories despite massive brain damage. He discusses evidence from planarian experiments, which I discussed in my post here. There is evidence that decapitated planarians can retain memories they have learned. Verny also mentions studies showing that animals can retain memories very well after hibernation, which causes large loss of brain cells. He also discusses evidence that caterpillars turning into butterflies can retain as butterflies things they learned as caterpillars, despite the almost total reorganization of the organism during metamorphosis.

Failing to provide any evidence of memories being stored in any cells (either below the neck or above the neck), but merely evidence of organisms remembering things despite heavy brain damage, Verny concludes by stating this:

"It seems credible to conclude that memory, in addition to being stored in the brain, must also be encoded in other cells and tissues in the body. In other words, we are all endowed with both somatic and cognitive memory systems that mutually support each other. In aggregate, the evidence suggests that aspects of intelligence and consciousness traditionally attributed to the brain have another source as well. Our memories, our tastes, our life knowledge, might owe just as much to embodied cells and tissues using the same molecular mechanisms for memory as the brain itself. The mind, I conclude, is fluid and adaptable, embodied but not enskulled."

Other than facts suggesting the brain cannot be the source of human thinking and the storage place of human memories, there are no reasons to believe the idea of cognition and memory coming from cells below the neck. We know that a person can lose very many of his cells below the neck without any effect on cognition or memory. Specifically:

- A person will not lose any of his memories or cognitive abilities if he loses an arm, both arms, a leg or even both legs.
- A very overweight person may gradually lose half of his weight through either dieting or food deprivation, but this will have no effect on his memories or cognitive abilities.
- A person may have a lung transplant, but this will have no effect on his memories or cognitive abilities. After getting such a transplant, he will not have some knowledge he did have before, that was learned by the person from whom the lung came.
- A person may have a heart transplant, but this will have no effect on his memories or cognitive abilities. After getting such a transplant, he will not have some knowledge he did not have before, that was learned by the person from whom the heart came.

Before 1800 no one ever lost half of their brain because of surgical operations. Hydrocephalus that damages the brain occurs in about 3 cases in 1000, but cases involving major brain damage are much more rare, involving fewer than 1 case in 1000. It is hardly believable to assume that evolution would have provided some back-up cognitive system to deal with such rare cases. Believing such a thing would be like believing that some organism would evolve a parachute-like organ on its back, to cover the maybe 1 case in 1000 when organisms of that type might fall off a cliff. We have no evidence in the natural world that organisms have systems that serve only to cover extremely rare unfortunate events.

The posts on this blog discuss many reasons for disbelieving the claim that memories are stored in brains, and quite a few of these reasons would apply in equal force to claims of memories stored below the neck. I will give one example. One of the greatest wonders of the human mind is the wonder of instantaneous memory recall, such as occurs when you instantly provide information on a topic after hearing a single word or name. For reasons discussed here, such a capability cannot be explained by neural action, because the brain is completely lacking in anything like an indexing system, a coordinate system, or a position notation system that would allow the exact position of some stored memory to be instantly found. Exactly the same objection applies to the body below the neck, which is also completely lacking in anything like an indexing system, a coordinate system, or a position notation system. And just as there is no evidence of anything in the brain that could write learned information or read learned information, there is no evidence of any such thing existing below the neck (except for hands that don't write inside the body).

We have no evidence of memories being physically stored below the neck. We do have very much evidence that humans have something like souls. A major part of this evidence is what occurs during out-of-body experiences, in which people (with not diminished minds and memories) report floating out of their bodies and observing their bodies from a higher elevation. Such experiences (which have never been explained in a credible manner by materialists) are reported by significant fractions of the population. The source here discusses a variety of surveys taken to try to determine how common out-of-body experiences are. It gives numbers which suggest that out-of-body experiences occur to significant fractions of the human population, something like between 10% and 20%. Observation of a person's body from some height above the body is extremely common in near-death experiences, which are reported by significant fractions of the population.

In the long paper here, 14 cases of out-of-body-experiences are discussed. We read this: "In all of the cases that we have described in this paper, the experiencer reported all three features that we discussed earlier as having the most relevance for the question of survival of consciousness: normal or enhanced mentation when the physical body is ostensibly unconscious, seeing the physical body from a different position in space, and perceiving events beyond the normal range of the physical senses."

Rather than assuming that memories that cannot be found in the brain exist in the body below the neck, a better assumption is that memory is a fundamental aspect of the human soul.

at November 04, 2021 5 comments:

Labels: high mental function despite large brain damage, memory storage

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Head Truth

The huge case for thinking minds do not come from brains

Friday, October 29, 2021

Panpsychism Arguments Involve an Equivocation Fallacy

One of the main type of argumentative fallacies is what is called the equivocation fallacy. A web page states, "The fallacy of equivocation occurs when a key term or phrase in an argument is used in an ambiguous way, with one meaning in one portion of the argument and then another meaning in another portion of the argument." Below is an example of an argument that uses the fallacy of equivocation.

"Cosmologists say there is dark matter in space, and we should believe them. The undeniable fact that dark matter exists is shown by the fact that geologists have found many dark rocks, and the fact that there are many people with dark skin in Africa. Since we clearly have seen many examples of dark matter such as tar, coal, ebony and dark-skinned Africans, we should not doubt cosmologists when they talk about the reality of dark matter."

What cosmologists refer to dark matter they are referring to a hypothetical invisible non-atomic substance in space. In this example the equivocation fallacy occurs because "dark matter" is used to refer to totally different things. When the argument refers to the dark matter in "tar, coal, ebony and dark-skinned Africans," the argument is referring to normal visible atomic matter. But in the first and last sentence the argument is referring to the dark matter referenced by cosmologists, which is something totally different, an invisible non-atomic matter. The existence of normal, visible, atomic matter that is dark does nothing to support the existence of the "dark matter" postulated by cosmologists, which is invisible non-atomic matter.

Here is another example of the fallacy of equivocation:

"*Cosmologists say that at the beginning the universe underwent inflation, and we should believe them. Anyone paying attention to how prices are rising must concede that inflation is real."*

The "inflation" referred to in the first sentence is the hypothesis that the universe had the briefest phase of exponential expansion. The inflation referred to in the second sentence is a rise in prices. The second type of inflation does nothing to establish the first.

Arguments for panpsychism typically involve a fallacy of equivocation like the ones we have just seen. A typical argument for panpsychism goes like this:

"It could be that every lifeless thing has consciousness, even tiny little particles. This might help explain human consciousness."

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The argument uses the word "consciousness" in two different ways, to refer to things as different as the sun and a ray of sunlight. An argument like this is being made by a professor hypothesizing that subatomic particles such as electrons have consciousness. But what exactly is imagined when such a hypothesis is suggested? Is the person arguing that electrons have their own little electron selves? No, such a suggestion would be too laughable. Is the person arguing that electrons have their own little electron lives? No, such a suggestion would be too laughable. Is the person arguing that electrons are aware of anything? It seems not, since electrons lack any sensory organs, and presumably lack any ESP or clairvoyance that would allow them to observe anything or discover facts without having senses. Is the person arguing that electrons understand anything or have thoughts? That would be ridiculous. How could an electron that always lacked any sensory organs and never learned any language ever have a thought about anything, or ever understand anything?

It seems that when this professor is hypothesizing that electrons have consciousness, what he really means to suggest is that maybe electrons have merely the slightest shadow of consciousness, a kind of millionth of a mind. If the professor were to present his argument without committing the fallacy of equivocation by using the word "consciousness" in two vastly different ways, the argument would sound like this:

"It could be that every lifeless thing has the slightest shadow of consciousness, a kind of millionth of a mind, even tiny little particles. This might help explain human consciousness."

Now the argument is presented without committing the fallacy of equivocation. But now the argument stands before us naked, and we can see that it has no force. The human mind is an incredibly rich and multi-faceted reality with very many extremely complex and impressive capabilities (many of which our philosophy and biology and psychology professors have deplorably failed to study because of all their senseless taboos that cause them to ignore many important parts of human experience). The human mind is so rich in capabilities that the practice of referring to it as merely "consciousness" (a word we might use for an insect's mind) is a speech sin that is like trying to make a molehill out of a mountain. We do nothing to explain the stunning multi-faceted richness of the human mind by imagining that particles in a body have "the slightest shadow of consciousness" or "a millionth of a mind."

What if a panpsychist were to actually assert what I dismissed above as "laughable," and claim that each electron has its own tiny electron life, and that each proton has its own tiny proton life? Such claims would be more "bottom-up baloney" worthless in explaining the human mind. If my brain consisted of trillions of electrons having the experience of being an electron and trillions of protons having the very different experience of being a proton, such trillions of diverse microscopic experiences would never add up to the radically different experience of being a human being.

Postscript: In a book dealing with the philosophy of mind, J. P. Moreland discussses an objection to panpsychism just like the one in the paragraph above, which he describes like this:

"Combination Problem—Sub-minds, such as those of atoms, cannot be conceived to combine or sum into complex, unified minds such as humans have. Hence, panpsychism is not an adequate account of mind."

A few pages later he says this about this Combination Problem: "I take this to be the Achilles heel of panpsychism." He discusses some attempts to evade the problem, none of which are credible.

at October 29, 2021 No comments:

Labels: panpsychism

Friday, October 22, 2021

Why Neuroscience Hasn't Delivered for Psychiatry

Recently a scholar lamented how little progress neuroscience is making. She stated the following:

"Given the massive investment of public and private funds, to say nothing of human ingenuity, time and effort over the past 70 years, we should by now know so much more about what cognition is, what it's for, and how it works – theories of these things, not simply data derived from brain activity. Think of how society has transformed since the 1950s....How much has been learned in so many fields?....Yet we still don't have a good grip on the fundamentals of cognition: how the senses work together to construct a world; how and where memories are stored long term, whether and how they remain stable, and how retrieval changes them; how decisions are made, and bodily action marshalled; and how valence is assessed."

The reason for so little progress is that our scientists keep spending millions and billions on fool's errands, trying to prove claims about brains producing minds and brains storing memories that have already been ruled out by low-level things that neuroscientists have discovered but ignored, facts such as the extremely high molecular and dendritic spine turnover in the brain, the short lifetimes of brain proteins, the extremely high levels of many types of noise in the brain, the unreliable transmission of synaptic signals in the brain, and the very many slowing factors in the brain that should make brains too slow for things such as very fast thinking and instant memory recall.

Another piece lamenting the lack of neuroscience progress is the paper "Why hasn't neuroscience delivered for psychiatry?" by David Kingdon, a professor of psychiatry. After noting some progress in medicine, Kingdon states the following:

"The major mental illnesses psychosis, bipolar disorder, anxiety disorders, anorexia nervosa and depression have proved remarkably resistant to similar developments. Unfortunately, it is still not possible to cite a single neuroscience or genetic finding that has been of use to the practicing psychiatrist in managing these illnesses despite attempts to suggest the contrary."

After noting the lavish funding that neuroscientists have long received in attempts to find a brain cause for mental illnesses, Kingdon states this:

"Why do we not have evidence of biological malfunctioning for severe mental disorders? Mental disorder can becaused by biological insults such as frontal lobe damage,dementia and delirium, but biological changes have yet to be shown to be relevant to the major mental disorders."

Talking about changes in the brain, Kingdon states this: "No such clear causative changes exist in severe mental illnesses such as depression, anxiety, bipolar disorder and schizophrenia." After noting "25 years of research frustation," Kingdon quotes a neuroscientist who advocates that we keep at this not-getting-much-of-anywhere research approach. Kingdon then states this:

"But does this not seem, after more than 30 years of failure, more akin to a religious or, albeit culturally influenced, persistent strong belief than one based on scientific grounds? Just where is the rational justification for ploughing the same furrow again and again?"

Kingdon then ends by stating this: "The time has come to challenge the justification for such relatively high levels of investment of time, expertise and resource in neuroscience for mental disorders."

I can give an answer to the question posed by Kingdon's paper, the question of, "Why hasn't neuroscience delivered for psychiatry?" The answer is that the main claims of neuroscientists about brains and minds are incorrect. Our minds are not produced by our brains as neuroscientists claim. So looking for neural causes of the main mental illnesses is an approach likely to fail. Once experts realize that mind is a fundamentally spiritual and psychic thing, they may start pursuing spiritual, social, psychological and psychic approaches to mental health treatment, approaches that may do far more for helping mental illness than neuroscientists have ever done.

By far the most common mental disorders are depressive and anxiety disorders. A web page tells us that 19 million Americans suffer from depressive disorders, 48 million suffer from anxiety disorders, 7 million suffer from bipolar disorders, and 1.5 million suffer from schizophrenia. The materialists who occupy neuroscience professor chairs are often people teaching things that may increase depression and anxiety. Such people often teach extremely gloomy views of life in which humans are regarded as mere accidents in a purposeless universe, beings destined to be silenced forever when they die. We may wonder whether people who believe in such teachings are far more likely to suffer from depression and anxiety.

But what if instead of suppressing evidence for a human soul, our professors were to educate us in such evidence? What if instead of suppressing from their textbooks and lectures and essays 1001 accounts by reliable witnesses suggesting that a human being is a soul and a spirit with abilities that cannot be explained by bodies, our professors were to tell us about such cases? What if instead of suppressing from their textbooks and lectures and essays dozens of neuroscience reasons for thinking that brains cannot be the source of our minds and the storage place of our memories, professors were instead to tell us about such reasons? What if professors were to speak honestly about the brain, telling us that there is no sign of any memories stored anywhere in it, and no understanding of how a brain could produce something like instant recall or a remembrance of things that happened fifty years ago? Then rather than thinking of themselves as some short-lived accident doomed to perish forever, people would tend to think of themselves as souls likely to survive death. It would be likely that anxiety and depression would be mitigated by such realism and honesty.

Postscript: One paper describes CT scans done on 500+ patients referred to a psychiatric institute:

"No abnormality was noted in 69% of CT scans. Cerebral atrophy, infarcts, cysts and calcific foci were present in 30% of patients. One patient

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- Animal Experiments Conflicting with the Dogma That the Brain Stores All Memories
- Memory Recall Reality Versus the "We Can't Remember Well" Bunk of Professors
- Neuroscientists Keep Using Misleading Coloring in Brain Visuals
- Most Scientists Don't Follow Formal Evidence Standards, Unlike Judges
- Experimental Evidence for ESP Is Well-Replicated
- Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades
- NIH Bets $1,434,188 That Synapses Don't Store Memories
- A New Case of Very Large Brain Damage and Normal Mental Function
- When Clue-Blind Professors Ignore All the Signs

presenting with focal neurology had a CT demonstrating an extradural haematoma which required neurosurgical intervention. No focal brain lesions, potentially responsible for the psychosis, were identified in any other patient. ***Conclusion:*** *Routine CT screening of patients who present with psychotic symptoms, in the absence of focal neurological deficit, does not add value to patient outcome, but rather contributes to the escalating health care expenses and unnecessary radiation dose.".*

For an interesting article on the topics discussed here, read "The Rise and Fall of Biological Psychiatry" here.

at October 22, 2021 2 comments:

Labels: psychiatry

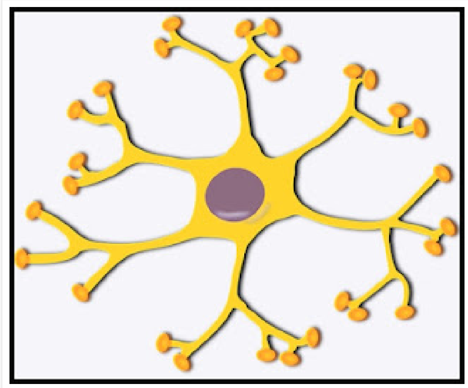
Wednesday, October 6, 2021

NIH Bets $1,434,188 That Synapses Don't Store Memories

In today's news we read a press release from the National Institute of Health entitled "NIH supports 106 grants featuring high-risk, high-reward research." The research discussed are projects with a high risk of failure, but which might yield a high reward if they succeed. We read the following: "Supported research this year includes understanding how long-term memory might be encoded in the shape of folded DNA in our neurons, mining data from unconventional sources to reveal social determinants of suicide, establishing new paradigms to address the functional consequences of health disparities in drug development, and looking at the impact of high school and collegiate athlete injuries on long-term health."

The first project mentioned (apparently NIH Project # 1DP2MH129985-01 discussed on this page) is relevant to the question of whether scientists currently have any credible theory of the storage of long-term human memories. For many decades scientists have been telling us that long-term memories are stored in synapses. There has never been any robust evidence or any credible detailed theory backing up such an idea. Everything we know about synapses suggests that they are totally unsuitable for the task of storing memories that can last for 50 years. For example, the proteins in synapses have average lifetimes of only a few weeks or less. Synapses have a high degree of structural dependency on dendritic spines, which are short-lived things that do not last for years. No one has ever proven that a synapse lasts for years, and we have good reason for believing they do not last for years.

What is interesting about this NIH Project # 1DP2MH129985-01 is that it is a kind of "heresy" project that is totally contrary to the "orthodoxy" that our neuroscientists have been spouting for decades about memory. The project has the wildly speculative title "The epigenetic encoding of learning and memory," which is a research project title as speculative as "Extraterrestrial UFO mother-ships near Jupiter." The idea that human memories are encoded in the genome or the epigenome is an idea totally contrary to what neuroscientists have been telling us for decades, that memories are stored in synapses. The genome and the epigenome are found in the center of cells. A synapse is a unit vastly tinier than a cell, outside of a cell or or on the outer edge of a cell. In the visual below depicting a neuron (one of the cells in the brain), the brown circle at the center is the location of the genome and the epigenome, and synapses (too small to show) would be located around the orange parts on the edges:



We see from the project page that the NIH has granted $1,434,188 of public funds for this new project. The project page presents no detailed research project plan. We merely get a vague project description that leaves the researchers free to play around pretty much in any way they want. That description often resorts to speculation stated as if it were fact. Here is the description (I'll put in boldface the very speculative parts that are not at all statements of fact):

*"**The nervous system requires tight control of transcription for processes such as learning and memory formation.** The field of epigenetics seeks to understand how changes to gene transcription occur in response to environmental cues and external signals such as those that our brains experience during learning. This proposal lies at the intersection of neuroscience and epigenetics, with a particular focus on chromatin biology. Chromatin is the complex of DNA and the histone proteins that wrap up DNA into complex structures, recruit key transcriptional regulators, and in doing so, control gene expression. **In recent years, it has become clear that disruptions to chromatin regulation lead to a range of neurological and mental health disorders such as post- traumatic stress disorder (PTSD).** However, we have a limited understanding of how chromatin functions in the brain or how its disruption can lead to disease. We will apply the tools and techniques of the epigenetics field to the study of neuronal function. In doing so, we hope to elucidate the molecular mechanisms that allow our brains to perform incredibly complex tasks and how disruption of these mechanisms can lead to neuronal dysfunction. We propose overcome long-standing hurdles in the field using a combination of novel techniques to reveal **how the epigenetic landscape encodes the transcriptional changes that underlie memory formation. Specifically, we seek to uncover the transcriptional signature of memory formation and memory maintenance within single neurons in an in vivo context.** We then will examine the epigenetic underpinnings of this transcriptional signature and manipulate specific components of the chromatin environment to define their contribution to learning and memory maintenance. First, in order to elucidate **the gene program associated with learning**, we will use single-nucleus RNA-sequencing in combination with mouse models that label **the specific neurons activated during learning**. This will allow us to examine **the transcriptional programs activated in neurons that form a memory engram compared to their neighboring cells at various times after learning**. Next, we will employ a quantitative biochemical approach uniquely available to our group as part of the Epigenetics Institute to characterize* the chromatin landscape changes the occur during memory formation, memory maintenance, and reversal learning. *Finally, we will modify the chromatin landscape by*

manipulating specific histone proteins in combination with numerous sequencing approaches to elucidate ***how chromatin controls learning and the transcriptional program.*** *Employing this novel combination of techniques will allow us to uncover* ***the mechanisms through which the epigenome encodes information within neurons to modify behavior both in the context of normal learning and in the context of maladaptive responses that lead to disorders such as PTSD****. If successful, these methods will 1) identify* ***the transcriptional signature that encodes a memory in neurons****, 2) map how* ***this signature is encoded by specific epigenetic regulatory mechanisms****, and 3) define* ***how the chromatin landscape affects memory formation and contributes to mental health disorders****."*

What we have here (in the boldface parts) are statements of an unfounded and wildly speculative theory: the contrarian idea that memories are stored in chromatin (consisting of DNA and proteins surrounding it) and an associated epigenome (consisting of kind of chemical marks next to parts of DNA) . Such statements are made in a matter-of-fact manner, as if such a "yet-to-reach-first-base" theory was fact. The not-yet-popular theory being suggested is one very different from what neuroscientists have been claiming for decades. For decades, neuroscientists have been telling us that memory formation occurs through "synapse strengthening," not through "transcriptional changes." We see no mention of the word "synapses" or "synaptic" in the quotation above.

The boldface above states an idea that makes no sense. "Transcriptional signatures" are transitory fleeting fluctuating biomarkers of the rates at which particular genes are being expressed. Conversely, for a long-term memory to be encoded in a brain there would need to be some all-but-miraculous effect that caused learned information or sensory experience to be permanently stored as brain states or synapse states, rather like letters being written into clay. Referring to "the transcriptional signature that encodes a memory in neurons" is rather like saying the words from your lips are a tape recorder that permanently store what you are saying. But since "transcriptional signatures" bear no resemblance to sensory experience, it's far worse, and would be more like making the double-goofy claim that your heart rate fluctuations are a tape recorder that record all the words you speak.

We should be extremely suspicious and skeptical whenever scientists suddenly start giving some new answer to a fundamental question, an answer completely different from the answer they have been dogmatically declaring for years. For example, if scientists were to suddenly start telling us that galaxies are not held together by gravity (as they've been telling us for decades), but by, say, "dark energy pulsations," we should be extremely skeptical that the new explanation is correct. In this case, there are very good reasons why the speculations in boldface above cannot be right.

Chromatin is a term meaning DNA and surrounding histone protein molecules. Histone molecules are not suitable for storing very long-term memories because they are too short-lived. A scientific paper tells us that the half-life of histones in the brain is only about 223 days, meaning that every 223 days half of the histone molecules will be replaced.

So histone molecules are not a stable platform for storing very long-term memories that can last for 50 years. But what about DNA? The DNA molecule is stable. But there are several reasons why your DNA molecules cannot be storing your memories. The first reason is that your DNA molecules are

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- Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"
- Exhibit A Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
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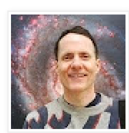

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already used for another purpose – the storing of genetic information used in making proteins. DNA molecules are like a book that already has its pages printed, not a book with empty pages that you can fill. The second reason is that DNA molecules use a bare bones "amino acid" language quite unsuitable for writing all the different types of human memories. The idea that somewhere your DNA has memory of your childhood summer vacations (expressed in an amino-acid language) is laughable.

The third reason is that the DNA of humans has been exhaustively analyzed by various multi-year projects such as the Human Genome Project and the ENCODE project, as well as various companies that specialize in personal analysis of the DNA of individual humans. Despite all of this huge investigation and analysis, no one has found any trace whatsoever of any type of real human memory (long-term or short-term) being stored in DNA. If you do a Google search for "can DNA store memories," you will see various articles (most of them loosely-worded, speculative and exaggerating) that discuss various genetic effects (such as gene expression) that are not the same as an actual storage of a human memory. Such articles are typically written by people using the word "memories" in a very loose sense, not actually referring to memories in the precise sense of a recollection.

The fourth reason is that there is no known bodily mechanism by which lots of new learned information can be quickly written to the storage area inside a DNA molecule. The fifth reason is that the DNA we see in brain neurons is basically identical to the DNA we see in other parts of the body (such as the DNA from foot cells). If memories were stored in DNA, the DNA in brain neurons would be much different from that of the DNA in other body parts. We can read DNA (including an epigenome) from dead bodies, and no one has ever found a memory in a dead body.

It takes about 1 minute for a cell to read only the small part of the DNA needed to make a single protein (and DNA has recipes for thousands of proteins). If your memories were stored in DNA, it would take you hours to remember things that you can actually recall instantly. Thinking that DNA can store your memories is like thinking that your refrigerator can print out your resume.

The epigenome consists of chemical "marks" on particular parts of DNA that can act to turn off or turn on particular genes. We already know the function of such chemicals (a function different from memory), and no one has any credible theory of how such chemicals could possibly fulfill such a function and also do the infinitely more complex task of storing a memory (which would be something like a functional broom that also lets you fly around like a witch). Reading and writing such chemical "marks" is a very slow affair, meaning the epigenome can't be the explanation for realities such as the instant recall of a memory or the instant formation of a new permanent memory.

But couldn't very-long term memories just be stored in some unknown part of a neuron? No, because the proteins that make up neurons have short lifetimes. A scientist explains the timescales:

"Protein half-lives in the cell range from about 2 minutes to about 20 hours, and half-lives of proteins typically are in the 2- to 4-hour time range. Okay, you say, that's fine for proteins, but what about 'stable' things like the plasma

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membrane and the cytoskeleton? Neuronal membrane phospholipids turn over with half-lives in the minutes-to-hours range as well. The vast majority of actin microfilaments in dendritic spines of hippocampal pyramidal neurons turn over with astonishing rapidity—the average turnover time for an actin microfilament in a dendritic spine is 44 seconds...As a first approximation, the entirety of the functional components of your whole CNS [central nervous system] have been broken down and resynthesized over a 2-month time span. This should scare you. Your apparent stability as an individual is a perceptual illusion."

There is no credible theory of human learned memories could be stored and retrieved by brains. The low-level facts we have learned about the brain reveal it to be an organ with enormous signal noise, unreliable synaptic transmission, billions of synaptic-gap signal slowers, and very high molecular turnover, an organ bearing no resemblance to a system for permanently storing and instantly retrieving memories with high information accuracy. The fact that the NIH is now betting $1,434,188 on some new theory of neural memory completely different from the memory storage doctrine neuroscientists have been teaching for decades is something that should lead us to suspect cognitive neuroscientists are in disarray, and very much lacking in credibility in their statements about brains and memory. Similarly, you should have little confidence in some astronomer if he told you (after twenty years of telling you that star shine is caused by nuclear fusion) that now he has a totally different theory of what causes starlight.

Postscript: The National Science Foundation's query tool shows that $600,000 has been allocated for another bet that synapses don't store memories. That is the amount of money allocated to the project described on this page:

https://www.nsf.gov/awardsearch/showAward?AWD_ID=2050850&HistoricalAwards=false

The project (NSF award # 2050850) is one entitled "Elucidation of RNA-Based Mechanisms of Long-Term Memory Storage." The idea of an RNA-based mechanism of long-term memory storage is an absurd one. RNA is a short-lived molecule. Referring to David Glanzman, the project incorrectly states, " the principal investigator has discovered that long-term memory (LTM) in the marine snail Aplysia appears to be stored in neurons by nuclear changes." No such thing has been discovered by Glanzman or anyone else. Glanzman's paper here received lots of press incorrectly talking about a "memory transfer" between marine snails. The paper provided no robust evidence for any such thing, and involved study group sizes of only 7, way too small for a reliable result.

at October 06, 2021 No comments:

Labels: memory storage, synapse theory of memory

Tuesday, September 21, 2021

They Wrote As They Would Have Written If Brains Don't Store Memories

Recently www.gizmodo.com asked a set of brain experts and technologists the question "Will it be possible to upload information to my brain?" The answer that should be given is: no, it never will be, because brains do not store

Labels

memories and do not store learned information. None of the respondents gives us this answer. But the answers we get are just the type of answers we would expect to get if (a) brains do not store memories and do not store learned information, and (b) there was an unwarranted dogma popular among neuroscientists that brains store memories and learned information.

Under such a case, we would expect the experts to kind of go around in circles, and fail to mention any specific way in which information could be uploaded to the brain; and we would expect the experts to say things such as "we need to learn much more before we can do this," just as if they had no real idea how someone could upload information to the brain. We might also expect the experts to give us "red herring" distractions, by referring to little things that have been done relating to the brain and technology, which are not at all uploading information or memories into brains. That is just what happens.

The first brain expert (Michael Beyeler) answers, "I think the prospect of augmenting our senses and our intellect with a brain device is certainly within our reach." But that was not the question he was asked, that question being whether information could be uploaded into the brain. He then states the following, making a misleading statement often made by neuroscientists:

"However, the biggest challenge I see is that our understanding of the brain is simply not good enough to make brain uploads viable. We need to better understand how information is stored and accessed in the brain."

The second sentence is misleading because it implies that there is some current understanding of how learned information is stored and accessed in the brain. There is no such understanding at all. No one has any detailed credible theory of how a brain could store and retrieve learned information. What we have learned about the brain suggests that it is totally unsuitable for such a task. There is no sign of any write mechanism in the brain, and no sign of any read mechanism in the brain. The synapses of the brain are places of constant molecular turnover, with the proteins that make up synapses having averge lifetimes of less than two weeks. No scientist has ever read infomation from a dead brain or some tissue extracted from a living organism, other than the genetic information that exists in all cells in the body. Therefore, statements such as "we need to better understand how information is stored and accessed in the brain" are misleading, because they imply that we have a partial knowledge of such a thing, when no such partial understanding exists. Such statements are like someone saying, "We need a better understanding of how extraterrestrials killed John Kennedy."

Next we hear from Rajesh P. N. Rao, who claims that there has already been some sending information into brains, but what he is talking about is not at all uploading information to brains, but merely sending signals into a brain. Then, committing an error just like the one described in the previous paragraph, Rao says that "uploading more complex information into a brain will require advances in at least three areas" including "a deeper understanding of how abstract information is processed and stored in the brain." Since there does not currently exist any understanding at all of how abstract information is stored or could be stored in the brain, it is misleading to say that we need a "deeper understanding" of such a thing, a statement incorrectly implying that there is currently some understanding of such a thing. Again, we have a statement that is like saying, "We need a better understanding of how extraterrestrials killed John Kennedy."

We then hear from Spencer LaVere Smith, who gives us the same confession that we don't know what to do to upload information into brains. Smith at least avoids the previously discussed error, by saying this:

"Uploading expertise in a new language or a detailed memory—that won't be possible anytime soon, for two reasons: (1) our technologies for manipulating neural circuitry are too crude, and (2) our understanding of what to manipulate and how is too primitive."

Smith rather gives away that neuroscientists have not the slightest idea of how to upload information into the brain by referring to a million-year timeframe for the accomplishment of such a task.

We next hear from Andrew Maynard, who speaks as if uploading into your brain is not something that will occur in the lifetime of anyone living, and says that "we almost certainly shouldn't" do such a thing. Then Kevin Warnick states, "As for downloading things like memories (which you haven't actually had) into the brain, I can't see any reason why this will not be possible in the future, but to do that we need to learn a lot more about how memories are stored and the process of recall." Again, we have a misleading insinuation that something is now known about memory storage in a brain. We have no such understanding at all.

We then hear from Dong Song, who states the following:

"First, I think this is definitely something theoretically possible. The common understanding in the scientific community is that information is stored in the brain in the form of synaptic weights and/or neural activities, and that these can be altered externally in many different ways, including via brain-machine interface. If they are altered in the right way, information will then be uploaded into the brain."

There is no such "common understanding" about synapses being the storage place of memories, and the use of "synaptic weights and/or neural activities" itself tells us about the lack of any such understanding (you would not use "and/or" followed by a vague phrase if there was an understanding of synapses storing memories). There is merely a senseless speech custom of claiming that memories are stored in synapses. Such a custom makes no sense because:

(1) no one has any credible detailed theory of how information could be stored through an alteration of weights, and we know of no one who has ever stored any complex information by altering weights;

(2) we know that humans can instantly form permanent new memories, something that would not be possible if memory storage involved an alteration of weights that would take at least several minutes;

(3) we know that the average lifetimes of proteins in synapses are only a few weeks or less, which is only about a thousandth of the length of time (50 years or more) that humans can remember things;

(4) we know that synapses typically last for relatively short times, because synapses are physically associated with dendritic spines that almost all last for a much shorter time than a year.

Song's claim that "information is stored in the brain in the form of synaptic weights and/or neural activities" suggests a lack of any real knowledge on this

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

topic, just as you would reveal a lack of any clear knowledge of who killed John Kennedy by saying that he was killed by "Oswald and/or some murky conspiracy."

"Synaptic strengthening" is the kind of jargon droplet that neuroscientists spit out when asked about neural memory storage, to try to make us think they have some understanding of such a topic. There is no detailed theory behind such an empty phrase, and the phrase is as empty as the vague empty phrase "cellular reconfiguration." When asked about how a brain could instantly recall a memory, neuroscientists don't even have any jargon droplets to spit out. The brain has no sign of repeated tokens used for memory storage, no sign of any stored images, no sign of a coordinate system or position notation system, and no sign of any indexes. So the brain is like some book with no letters, no characters, no photos and no pictures, without any page numbers, and without any index. Just as such a book would have no resemblance to an object for instantly retrieving information on a topic, the brain bears no resemblance to a device for instantly retrieving a memory such as humans are able to do.

We then hear from Gopala Krishna Anumanchipalli, who says this: "It is not inconceivable that one day, we could 'upload' more complex information like a new skill or delete a traumatic episode from memory." But he says nothing to suggest any idea of how such a thing could be done.

We then hear from William Eugene Bishop, who makes the same misleading insinuation of others by saying, "Our knowledge about the code for representing information and how that code is persistently stored in the brain—things that will come down to the level of individual neurons and how they are connected—is very limited." Again, the insinuation that some knowledge exists of such a thing. No such knowledge actually exists. After incorrectly referring to "our knowledge of how information is represented and stored in the brain," something that does not actually exist to any degree (except for the genetic information common to all cells), Bishop states, "while we are surely many years, likely decades, away from systems that could be routinely used to upload information to our brain, it seems likely that one day this will be possible," without doing anything to justify such a claim. The fact that such a job is predicted to occur only decades in the future gives away that the speaker has no understanding of how it could be done.

Finally Joshua R. Smith states, "I find it much harder to imagine that one could ever successfully generate in the brain higher level cognitive input in the brain, such as words or thoughts, or even sophisticated visual information at the level of readable text."

The answers the experts gave are just what we would expect to get if (a) brains do not store memories and do not store learned information, and (b) there was a groundless dogma popular among neuroscientists that brains store memories and learned information. Just as expected under such a case, we hear the experts go around in circles, and fail to mention any specific way in which information could be uploaded to the brain; and we mainly hear the experts say things such as "we need to learn much more before we can do this," just as if they had no real idea how someone could upload information to the brain.

The type of responses given are like the responses you might get if there were some experts calling themselves "cognitive podiatrists" who believed that memories are stored in the feet, and you asked them, "When will we be able to upload memories to people's feet?" Such experts might talk about this or that little experiment done with feet to try to create the impression that they are on the right track, and then they might say things like "we need to know a lot more about how feet store your memories before memories can be uploaded into feet."

at September 21, 2021 5 comments:

Labels: brain uploading

Thursday, September 2, 2021

The Inaccuracy of Electronic or Mechanical Metaphors for the Brain

Humans love to try to make metaphorical comparisons for things in biology, but most of these metaphors give the wrong idea. Often an organism or one of its organs is compared to something that humans made. But you vastly underestimate what a wonder a large organism is when you compare it to some mechanical device humans made. This is because human mechanical devices don't make copies of themselves. There is no airplane that splits itself into two working airplanes, and no car that reproduces itself. So every large organism is something vastly more impressive than anything humans have made.

Scientists like to compare the brain to some work of human invention. The most common metaphor is one in which the brain is compared to a computer. But this is not a correct comparison. For one thing, computers are controlled by software. We know of nothing in the brain that is equivalent to software. For another thing, computers have information storage devices unlike anything in the brain.

Consider a computer with a hard drive. Such a system is a stable data storage system in which newly acquired information can be permanently stored for many years. Such a system includes a read mechanism and a write mechanism, such as a read/write head that can be positioned to read or write at any location on a storage disk. Such a system also includes an addressing system allowing data to be stored at some exact location on the storage device, and allowing data to be very quickly read from some other exact location.

The brain has nothing like any such things. We know of neither a read mechanism in the brain nor a write mechanism in the brain. The brain seems to have no place where learned information could be permanently stored for many years, or even a single year. The most common claim about neural storage of memory is that memory is stored in synapses. But the proteins in synapses have average lifetimes of only two weeks or less, only about a thousandth of the maximum length of time that humans can remember things.

Since your computer has a filing system, you can add a named file to some particular directory on your computer. The brain has nothing that is equivalent to files. Because brains completely lack any coordinate system or position notation system, if you stored something in your brain you would never be able to quickly find it. Writing to the brain would be like throwing an index card into a swimming pool filled with index cards. Under such a system there is no way to quickly retrieve some exact piece of information you previously wrote. Since none of the locations of the brain have any addresses or coordinates, you could never retrieve something from the brain by doing something kind of like, "Okay, let me retrieve what I stored at neural address #73428234." No such addresses exist.

Another reason why the "brain as computer" metaphor is inappropriate is that humans have lives, consciousness and experience, a "life flow," which computers don't have. And contrary to the misleading term "artificial intelligence," computers don't actually understand anything (although they can process information). So you cannot explain your mind by saying it's caused by a computer between your skull. Your brain bears virtually no resemblance to a computer.

An alternate idea was presented long ago before computers were invented. William James wrote an 1898 book in which he wrongly asked us to assume that "thought is a function of the brain," something for which there was no good evidence for either in his time or today. He then presented a theory that imagined the brain as kind of a "receiver" that somehow in some sense receives mentality or thought transmitted from some external source. It is probably no coincidence that this theory came three years after Marconi invented the radio. In 1898 radios were the cool new gadget, so there might have been a certain appeal to comparing the brain to such a thing.

While there may well be truth in the idea that our mental capabilities come from some mysterious external source, the analogy between mental activity and radio reception was never a good one. A radio passively receives whatever is being transmitted on some particular frequency. But a human mind is a very active and thoughtful and creative reality, unlike the entirely passive and uncreative and thoughtless machine that is a radio receiver. So trying to draw an analogy between human minds (or human brains) and radio receivers was never a very good idea.

A recent article in Discover magazine gives us another example of trying to compare the brain to a mechanical device. The article is entitled "You brain is not a computer. It is a transducer." Again, we have a misguided analogy comparing the brain to a mechanical device. A transducer is usually a fairly simple device converting some analog signal into electrical signals. Do a Google image search for "transducer," and you'll see some little gadgets looking like this:

The author (a psychologist named Robert Epstein) dares to contradict the unfounded dogma of neural memory storage, one that has been stated so many times in Discover magazine (a bastion of biology groupthink). Mentioning someone (Barenboim) who has memorized incredibly large amounts of musical information, Epstein states the following:

"Do you think all this content is somehow stored in Barenboim's ever-changing, ever-shrinking, ever-decaying brain? Sorry, but if you study his brain for a hundred years, you will never find a single note, a single musical score, a single instruction for how to move his fingers — not even a 'representation' of any of those things. The brain is simply not a storage device."

I am very pleased that we can read in the very mainstream Discover magazine the same contrarian idea that I have advanced for several years on this blog, that brains do not store human memories. Unfortunately, Epstein's article is so rambling and disorganized that I cannot recommend it for much other than getting links that may point you to interesting anomalies worth reading about further. At one point Epstein rather seems to suggest the very silly idea that maybe mind is kind of sent to you from a parallel universe imagined by speculative physics. There is no good evidence for any such universes, and no explanatory need to believe in them. If such universes existed, they would not be a credible source for any of the main human mental phenomena.

We can seem to see in the article the effects of the mainstream's thought taboos. Epstein seems very interested in anomalies that cannot be explained by conventional claims about the brain. But he seems to forbid himself from discussing the best-documented anomalies of this type: things such as ESP, apparition sightings, out-of-body experiences and inexplicable successes by mediums. Instead he draws our attention to interesting but less-established anomalies such as terminal lucidity (when those with dementia suddenly regain normal mentality shortly before dying) and near-death experiences of the blind. But why should we study such things and avoid studying the evidence for ESP, apparition sightings, out-of-body experiences and inexplicable successes by mediums, when the evidence for such things is much better and more voluminous than the evidence for terminal lucidity or near-death experiences of the blind?

It is as if Epstein is carrying around in his pocket a list of taboo things he is forbidden from discussing, for fear of being deprecated by his colleagues who never studied such things but have negative opinions about them; and it is as if Epstein feels free to mention other anomalies that discredit conventional ideas about the brain, only because his academia colleagues haven't yet got around to declaring such things taboo.

I regard Epstein as someone who might become a solid thinker about minds and brains once he gets his thoughts more organized and starts making a much wider study of anomalies that cannot be explained under "your brain makes your mind" ideas, without paying attention to which topics have been declared taboo by his colleagues. I recommend that he lose his "brain as transducer" idea, which makes little sense, and also recommend he discard his weird claim that he has "decapitated consciousness" by showing that it is not mysterious. The more we learn about the mind, the more mysterious it seems.

The brain cannot be accurately compared to any mechanical or electronic device. Discarding all the unfounded claims made about brains (so often contradicted by low-level facts we have learned about brains), we can have a good minimalist concept of the brain: that the brain is a helper organ that helps other parts of your body do their jobs. So the brain helps your eyes see, your muscles move, your ears hear, and your lips speak; and also the brain helps your lungs to keep breathing at the right rate, and your heart to keep beating at the right rate; and your brain helps your pain receptors alert you of pain.

There is no electronic or mechanical device that acts in all those ways. As for the human mind, it cannot be compared to any device humans have created, not even to computers which don't actually have lives or experience or understanding.

at September 02, 2021 1 comment:

Thursday, August 12, 2021

A New Case of Very Large Brain Damage and Normal Mental Function

In this blog I have discussed many cases of normal or near-normal mental function despite massive brain damage. For example, in the post here and the posts here and here you can read about people who had normal function after removal of half of their brain in hemispherectomy operations. At those links you can also read about people who had normal mental function despite losing far more than half of their brain because of disease. The scientific paper here describes a patient (P.G.) who scored 142 on an IQ test, even though the right hemisphere of the brain had been removed (as well as a patient D.W. who scored 100 on an IQ test after the left hemisphere of the brain had been removed).

There has just been reported a new case of someone with normal or almost normal mental function despite having massive brain damage. I found the case on the science subreddit of reddit.com (https://www.reddit.com/r/science). The original link goes to a science journal letter to the editor behind a paywall, a letter entitled "A case of extreme hydrocephalus in a 67-year-old man whose professional and social lives were normal." But one of the reddit users has quoted the letter to the editor, so we can see the details of the case by using the link here and pressing the blue "View Entire Discussion" button to see all comments. At that link we read this quotation from the letter to the editor:

"A male patient first consulted when he was 67 for gait disorders related to Parkinson's disease. The cerebral MRI performed on this occasion showed a very large tetra-ventricular hydrocephalus...His education was completed without remarkable difficulty, he obtained a Vocational Training Certificate and worked in an insurance company. He retired after 40 years and 3 months of work. He has always been very active during his professional life without ceasing work for any disease. According to his brothers, he was very curious, interested in history and had an excellent memory. During his first medical visit, the clinical examination showed both pyramidal and extra-pyramidal syndromes. Occipito-frontal circumference (OFC) was 64 cm (+5 SD). Mini-mental state examination (MMSE) was 27/30 (recall was perturbed), Frontal Assessment battery (FAB) was 17/18 (verbal fluidity was slightly impaired). Cerebral MRI showed a massive communicating hydrocephalus (figure 1A) predominating on the frontal lobes (figure 1B). On FLAIR sequences, hypersignals were noted in the periventricular regions. Furthermore, ruptured septa or pseudo-septa were present on both sides predominating on the left ventricle (figure 1 C and D). In the frontal region, the hemispherical wall was very thin (from 3.4 to 3.8 mm) with an overlying cortex totally unfolded (Figure 1 B and D). The corpus callosum was very thin, stretched by ventricular dilation (Figure 1A). ...Both the clinical history as told by his family and macrocephaly suggest that this hydrocephalus developed very early during the life of this patient....Despite this major hydrocephalus,

patient's professional life was normal. There was only a delay of motor acquisitions and language; this delay vanished during his adolescence."

The disease suffered by this man is hydrocephalus, in which there can arise very large fluid-filled cavities in the brain. If you go to the page here showing the letter to the editor (behind a paywall) you can see four thumbnail images showing this man's brain. We can see gigantic fluid-filled cavities in the man's brain, which appear as dark holes in the images. An image from one angle seems to show about 75% or more of the brain tissue missing (although a view from another angle makes it look more like about 50% of the brain tissue missing).

We read that the very brain-damaged subject (age 67) had a score of 27 out of 30 on the Mini-Mental State Examination (MMSE), which is a good score that you or me might get (you have to score 24 or lower for a doctor to regard the score as evidence of dementia). According to the link here, the average MMSE score for people between 65 and 74 is 22.4. The very brain-damaged subject had a score of 17 out of 18 on the Frontal Assessment Battery test (FAB), which is higher than average for persons of his age (according to the link here, the average score for people in their sixties is 16).

In a similar vein, the paper here describes tests on a person born without a left temporal lobe of the brain. We are told "she performed within normal range on all language assessment tasks" and that she "performed within normal range on both general cognitive assessments."

Once again, we have evidence that people can have normal minds despite the most massive brain damage. Clinging stubbornly to their unwarranted dogma that the brain is the source of the mind, our neuroscientists continue to avoid putting "two and two together" by realizing the implications of such findings of very high brain damage and normal mental function, just as they avoid putting "two and two together" by failing to realize the implications of very common out-of-body experiences in which people report viewing their bodies while floating outside of their bodies. The data from "very heavy brain damage" medical case histories and the data from parapsychology case histories tell us the same thing: that your brain is not the source of your mind.

at August 12, 2021 1 comment:

Labels: high mental function despite large brain damage

Wednesday, August 11, 2021

Study Group Sizes, Neuroscience and COVID-19

On this blog I have frequently complained about the way-too-small study group sizes used so often in neuroscience studies. This is one of the biggest reasons for doubting the reliability of very many neuroscience studies. Two other equally great problems are the failure to pre-register a single detailed hypothesis and the methods that will be used to analyze and collect data before starting an experiment (the "fishing expedition" problem), and the failure of so many neuroscience experimental studies to declare and follow a detailed blinding protocol to mimimize experimenter bias. The "bare minimum" for a halfway-trustworthy experimental study is 15 subjects per study group, but neuroscience experiments often use fewer than 15 subjects for particular study groups.

A completely different situation now exists in regard to COVID-19 vaccines. The study group size nowadays for a particular vaccine is the total number of people who have taken that vaccine. By now the study group size for each of the approved COVID-19 vaccines is millions of times greater than the way-too-small study group sizes so often used in neuroscience studies. It would seem, therefore, that based on study group sizes you should have high confidence in the reliability of COVID-19 vaccines that have already been used by many millions of people.

I myself have got two doses of a COVID-19 vaccine, as have my wife and daughters. I recommend that others do the same. It seemed reasonable to take a "wait and see" attitude when relatively few people had been vaccinated, but as more and more millions of people get vaccinated without a problem, it seems the case for getting a vaccine (at least from a study group size standpoint) is getting stronger and stronger.

at August 11, 2021 No comments:

Labels: COVID-19, vaccines

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Head Truth

The huge case for thinking minds do not come from brains

Thursday, August 5, 2021

Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades

Scientists have very fancy equipment for examining brains at very high resolution. But no microscopic examination of a brain has ever proven or even supported the claim that brains store memories. The most common claim about a brain storage of memories is that memories are stored in synapses. But the paper here confesses, "Very few studies report long-lasting structural changes of synapses induced by behavioral training."

There are two types of ways to examine brain tissue: *in vivo* or *in vitro*. An *in vitro* examination means looking at some tissue that has been removed from an organism, or some tissue in a dead organism. An *in vivo* examination means examining tissue in a living organism. When examining human tissue, there are rather severe constrains on what can be seen i*n vivo*. But there are no constraints on *in vitro* examinations of newly deceased humans, whenever such humans have donated their bodies to medical science. The brains of quite a few such humans have been minutely examined with the most sophisticated equipment. No one has ever found evidence of a memory stored in a brain. No one has ever read a memory from a dead person.

There are a number of ways to do *in vivo* examinations of the brains of living organisms. One technique is called time-lapse two-photon laser micrsocopy. Such technology is not good enough to clearly inspect individual synapses, which are very small. But such microscopy is good enough to show what are called dendritic spines.

A dendritic spine is a tiny protrusion from one of the dendrites of a neuron. The diagram below shows a neuron in the top half of the diagram. Some dendritic spines are shown in the bottom half of the visual. The bottom half of the visual is a closeup of the red-circled part in the top of the diagram.

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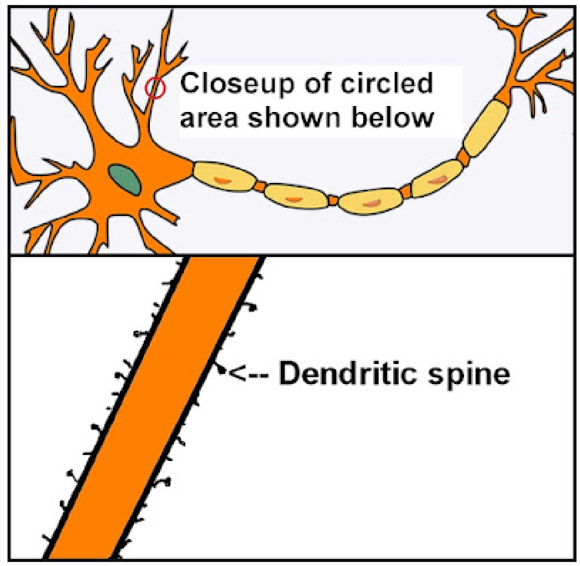


An individual neuron in the brain may have about a thousand such dendritic spines. The total number of dendritic spines in the brain has been estimated at 100 trillion, which is about a thousand times greater than the number of neurons in the brain. The total number of synapses in the brain has also been estimated at 100 trillion. A large fraction of synapses are connected to dendritic spines. So by studying how long dendritic spines last, we can tell a good deal about how long synapses last.

It has been hoped that some relation could be drawn between learning and the formation of new dendritic spines. But scientists try to insinuate a connection between LTP and learning, and a paper says that "Sorra and Harris measuring three-dimensional reconstructed spines from serial section EM pictures, could not find any significant effect of LTP on morphological properties of spines."

No doubt the first scientists who examined dendritic spines were hoping to see some nice regularity and order, perhaps something that might be some kind of coding system by which dendritic spines might store information. But dendritic spines show no such regularity. Unlike positions in a DNA molecule (which must be one of only four nucelotide base pair types), dendritic spines can be any of many sizes, shapes or lengths. A length of dendrite and its spines (like the length shown in the bottom half of the visual above) seem to bear no resemblance to encoded information. The vast majority of new dendritic spines do not last longer than a few months.

Some unconvincing science papers have attempted to suggest a link between learning and dendritic spines. Here's what goes on in a typical paper of this type:

(1) Some rodent will be given some learning, such as fear conditioning.
(2) Various dendritic spines will be examined.
(3) Some newly formed dendritic spines will be declared to be "experience dependent," because they appeared while the learning took place.

It is easy to explain why such papers use an illegitimate methodology. There are very many billions of dendritic spines in the brain, and they come and go rapidly and randomly. So anyone with a good enough microscope could find some stretch of dendritic spines that increased during learning, just as you could find some stretch of dendritic spines that decreased during learning. There is never any good basis for claiming that some stretch of dendritic spines increased *because* of some particular type of learning. Similarly, looking around outside I could find some row of leaves that grew bigger when I was studying something, but there would be zero reason for thinking that such an increase was caused by my learning.

Some studies compare two different sets of subjects, one that was exposed to learning, and another that was not exposed to learning. The studies may report that the subjects exposed to learning had a greater growth of dendritic spines. This is not at all good evidence that dendritic spines have anything to do with learning. We would expect that if dozens of experiments compared sets of dendritic spines undergoing random fluctuations, that some of them would report (purely by chance) that in some of those sets there was a greater growth of dendritic spines. Similarly, if 100 experimenters tracked the pimples of young teenagers with acne both during the first three months of the school year and during summer vacation, some of the experimenters might report greater numbers of new pimples growing during the first three months of the school year, even though there is no causal connection between learning and the number of pimples a teenager may have on his or her skin.

By examining the tiny protrusions that are dendritic spines, scientists can get some idea of how stable or unstable these dendritic spines are. If such spines are very unstable, it is a great problem for any theory that memories are stored in synapses. Unstable dendritic spines would suggest that synapses are unstable, and are unlikely to be a place where memories could be stored for decades. Even without studying dendritic spines, we have the strongest reason for believing in the instability of synapses: the fact that proteins in synapses have average lifetimes of only a few weeks.

Dendritic spines last no more than a few months in the hippocampus, and less than two years in the cortex. This study found that dendritic spines in the hippocampus last for only about 30 days. This study found that dendritic spines in the hippocampus have a turnover of about 40% each 4 days. This study found that dendritic spines in the cortex of mice brains have a half-life of only 120 days. The wikipedia article on dendritic spines says, "Spine number is very variable and spines come and go; in a matter of hours, 10-20% of spines can spontaneously appear or disappear on the pyramidal cells of the cerebral cortex." Referring to i*n vivo* observations of dendritic spines in the mouse hippocampus, the paper here says the authors "measured a spine turnover of ~40% within 4 days." The 2017 paper here ("Long-term in vivo imaging of experience-dependent synaptic plasticity in adult cortex") found the following regarding dendritic spines in the cortex of rodents:

"About 80% of synapses were detectable for a day or longer; about 60% belonged to the stable pool imaged for at least 8 days. Even this stable pool was found to turn over, with only, 50% of spines surviving for 30 days or longer. Assuming stochastic behaviour, we estimate that the mean lifetime of the stable pool would be on the order of 120 days."

We have no good evidence that any dendritic spines survive for more than a few years. There is an often-cited paper from the year 2000 with the title "Stably maintained dendritic spines are associated with lifelong memories." The title is misleading, like the title of so many scientific papers. The paper actually found that "a tiny fraction of daily formed new spines (~0.2% of the total spines) could persist for 3–5 months." So the paper found that only 1 in 500 dendritic spines persist for as long as 5 months. The paper resorts to some dubious math to try to hypothesize that some dendritic spines may last for years.

More recent papers have made even more clear the high turnover rate of dendritic spines, and have made it seem less likely that any dendritic spines survive for more than a few years. The 2015 paper "Impermanence of dendritic spines in live adult CA1 hippocampus" states the following, describing a 100% turnover of dendritic spines within six weeks:

"Mathematical modeling revealed that the data best matched kinetic models with a single population of spines of mean lifetime ~1–2 weeks. This implies ~100% turnover in ~2–3 times this interval, a near full erasure of the synaptic connectivity pattern."

The paper here states, "It has been shown that in the hippocampus in vivo, within a month the rate of spine turnover approaches 100% (Attardo et al., 2015; Pfeiffer et al., 2018)." The 2020 paper here states, "Only a tiny fraction of new spines (0.04% of total spines) survive the first few weeks in synaptic circuits and are stably maintained later in life." The author here is telling us that only 1 in 2500 dendritic spines survive more than a few weeks. Given such an assertion, we should be very skeptical about the author's insinuation that some very tiny fraction of such spines "are stably maintained." No one has ever observed a dendritic spine lasting for years, and the observations that have been made of dendritic spines give us every reason to assume that dendritic spines do not ever last for more than a few years.

The same studies that show such short lifetimes for dendritic spines show that while they exist, dendritic spines very rarely maintain the same size and shape. During their short lifetimes, dendritic spines tend to change very much in size and shape.

Human memories can last a lifetime, but synapses and the dendritic spines they attach to are very unstable "shifting sands" types of things. "Unstable dendritic spines" implies "unstable synapses," which implies that scientists must be wrong when they claim that memories are stored in synapses. Stable human memories can last for 50 years, so we cannot believe they are stored in things as unstable as synapses and dendritic spines. Studies on the lifetime of the proteins that make up synapses and dendritic spines tell us that such proteins last only a few weeks. Synapses and dendritic spines are as unstable as fallen maple leaves. The brain has no place that it could be storing memories that last for decades.

Postscript: The failure of neuroscientists to listen to what dendritic spines are telling us is epitomized by a 2015 review article on denditic spines, which states, "It is also known that thick spines may persist for a months [sic], while thin spines are very transient, which indicate that perhaps thick spines are more responsible for development and maintenance of long-term memory." It is as if the writers had forgotten the fact that humans can remember very well memories that last for 50 years, a length of time a hundred times longer than "months."

at August 05, 2021 8 comments:

Labels: brain shortfalls, dendritic spines, memory storage

Saturday, July 24, 2021

Experimental Evidence for ESP Is Well-Replicated

While examing the Science subreddit on www.reddit.com (www.reddit.com/r/science) the other day, I noticed there is a new meta-analysis about ESP experiments. The meta-analysis is an interesting case example of presenting evidence for paranormal phenomena in pretty much the most hard-to-unravel way possible. If he works very hard, and uses some geeky little computer tricks, it is possible for a reader to get to the core data that is compelling evidence for extrasensory perception. But it is almost as if the authors were trying to minimize the chance of readers discovering such core data. In this post I will discuss that core data in a way that saves you from doing all that hard work.

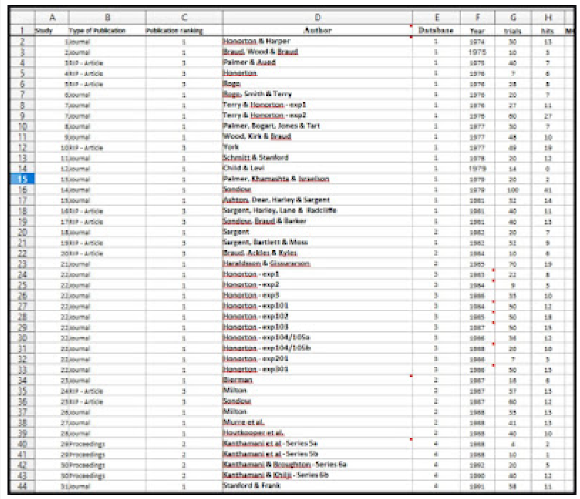
The meta-analysis ("Anomalous perception in a Ganzfeld condition - A meta-analysis of more than 40 years investigation" by P. Tressoldi and Lance Storm) discusses ESP experiments using what is called the Ganzfeld protocol. A ganzfeld experiment is one in which a test for extra-sensory perception is combined with sensory deprivation achieved through methods such as cutting a ping-pong ball in half and taping it over someone's eyes, and having someone wear an earphone transmitting white noise. In these ESP experiments, the expected chance hit rate (matching of a user's selection and a random target) is 25%. Ganzfeld experiments have a long history of scoring a "hit rate" well over the expected chance result of 25%.

What we want to know upon reading the new meta-analysis is: how high a "hit rate" did the experiments score? Unfortunately, the authors have made it ridiculously hard to discover this key number. The meta-analysis authors mention "hit rates" far about 25% reported by other meta-analysis papers. But nowhere in their paper do they report the "hit rate" found by their meta-analysis.

Instead, the authors report what statisticians call an "effect size." The concept of an effect size will not be clear to non-scientists or non-mathematicians. But everyone can understand that if a long series of ESP experiments reports an average "hit rate" far above the expected-by-chance "hit rate" of 25%, then you have powerful experimental evidence for ESP.

There is a way to get the "hit rate" reported by this meta-analysis, but it requires some geeky tricks that few readers would naturally achieve. If you click the link here provided by the paper, you will find a page with a series of links on the left side. If you click the third link in this series, you will see a table with some experimental results. But you will not see the full set of experimental results used in the meta-analysis. You will see only 50 rows. There is then a link that says, "This dataset contains more than 50 rows. To see the remaining content please download the original file." There is a link that allows you to download a spreadsheet file (GZMADatabase1974_2020.xlsx). Part of it is shown below.

- Why Neuroscience Hasn't Delivered for Psychiatry
- Panpsychism Arguments Involve an Equivocation Fallacy
- He's Strangely Seeking Memories in Cells Below the Neck
- Just Call Them "Machine-Metaphor-Misguided"
- Way Off in Their Predictions, Neuroscientists Keep Misdescribing Human Memory Performance
- The Biggest Brain Projects Are Still Failing to Support Prevailing Brain Dogmas
- A New Paper Reminds Us Neuroscientists Can't Get Their Story Straight About Memory Storage
- NSF Grant Tool Query Suggests Engrams Are Not Really Science
- Suspect Shenanigans When You Hear Claims of "Mind Reading" Technology
- No, a USC Team Did Not Show "How Memories Are Stored in the Brain"
- Why ESP Discredits the "Brains Make Minds" Claim
- Beware of Neuroscientists Using Cell Nicknames
- The Press Often Gives Us Fake News About Brains
- No Solid Principle Justifies "Brains Make Minds" Thinking
- "Thousands of Participants Are Needed for Accurate Results," But Most Brain Scan Studies Don't Even Use Dozens
- Why the Academia Cyberspace Profit Complex Keeps Giving Misleading Brain Research Reports
- "Brains Make Minds" Idea Flunks an Audit of a Large Brain Scan Database
- Big Study Finds Brain Gray Matter and Cortical Thickness Peak at Age 6 or Earlier, Contradicting Brain Dogmas
- Why the "A Memory Is Stored Throughout the Brain" Idea Makes Things Much Worse
- Principles of a Post-Materialist Science
- EEG Studies Fail to Provide Robust Evidence That Brains Think or Retrieve Memories
- Seven Things in Fast Retrieval Systems, None of Which Your Brain Has
- Studies Debunk Hippocampus Memory Myths
- 11 Authorities Seem to Realize That "Your Brain Is a Computer" Is a Junk Metaphor



	Study	Type of Publication	Publication ranking	Author	Database	Year	trials	hits
2	1	Journal	1	Honorton & Harper	1	1974	30	13
3	2	Journal	1	Braud, Wood & Braud	1	1975	10	3
4	3	RIP - Article	3	Palmer & Aued	1	1975	40	7
5	4	RIP - Article	3	Honorton	1	1976	7	6
6	5	RIP - Article	3	Rogo	1	1976	28	8
7	6	Journal	1	Rogo, Smith & Terry	1	1976	20	7
8	7	Journal	1	Terry & Honorton - exp1	1	1976	27	11
9	7	Journal	1	Terry & Honorton - exp2	1	1976	60	27
10	8	Journal	1	Palmer, Bogart, Jones & Tart	1	1977	30	7
11	9	Journal	1	Wood, Kirk & Braud	1	1977	48	10
12	10	RIP - Article	3	York	1	1977	49	19
13	11	Journal	1	Schmitt & Stanford	1	1978	20	12
14	12	Journal	1	Child & Levi	1	1979	14	0
15	13	Journal	1	Palmer, Khamashta & Israelson	1	1979	20	2
16	14	Journal	1	Sondow	1	1979	100	41
17	15	Journal	1	Ashton, Dear, Harley & Sargent	1	1981	32	14
18	16	RIP - Article	3	Sargent, Harley, Lane & Radcliffe	1	1981	40	11
19	17	RIP - Article	3	Sondow, Braud & Barker	1	1981	40	13
20	18	Journal	1	Sargent	2	1982	20	7
21	19	RIP - Article	3	Sargent, Bartlett & Moss	2	1982	32	9
22	20	RIP - Article	3	Braud, Ackles & Kyles	2	1984	10	6
23	21	Journal	1	Haraldsson & Gissurarson	2	1985	70	19
24	22	Journal	1	Honorton - exp1	3	1983	22	8
25	22	Journal	1	Honorton - exp2	3	1984	9	5
26	22	Journal	1	Honorton - exp3	3	1986	35	10
27	22	Journal	1	Honorton - exp101	3	1984	50	12
28	22	Journal	1	Honorton - exp102	3	1985	50	18
29	22	Journal	1	Honorton - exp103	3	1987	50	15
30	22	Journal	1	Honorton - exp104/105a	3	1986	34	12
31	22	Journal	1	Honorton - exp104/105b	3	1988	20	10
32	22	Journal	1	Honorton - exp201	3	1986	7	3
33	22	Journal	1	Honorton - exp301	3	1988	50	15
34	23	Journal	1	Bierman	2	1987	16	6
35	24	RIP - Article	3	Milton	2	1987	37	13
36	25	RIP - Article	3	Sondow	2	1987	60	12
37	26	Journal	1	Milton	2	1988	35	13
38	27	Journal	1	Murre et al.	2	1988	41	13
39	28	Journal	1	Houtkooper et al.	2	1988	40	10
40	29	Proceedings	2	Kanthamani et al. - Series 5a	4	1988	4	2
41	29	Proceedings	2	Kanthamani et al. - Series 5b	4	1988	10	1
42	30	Proceedings	2	Kanthamani & Broughton - Series 6a	4	1992	20	5
43	30	Proceedings	2	Kanthamani & Khilji - Series 6b	4	1990	40	12
44	31	Journal	1	Stanford & Frank	4	1991	58	11

What if you don't have a spreadsheet program on your computer? Then you're out of luck, and can't discover the key number of the "hit rate."

There is no excuse for presenting such road blocks to the reader. Web sites since the early 1990's have been perfectly capable of displaying the simple tabular data that is in this spreadsheet, by using the HTML protocol used since the early 1990's, a protocol fully capable of displaying tabular data. There is no reason why such tabular data could not have been fully displayed in the meta-analysis paper, so users would not have to fool around with external links and downloads. And there's no reason why the paper could not have included a single sentence summarizing the number of trials, number of successful hits, and hit rate.

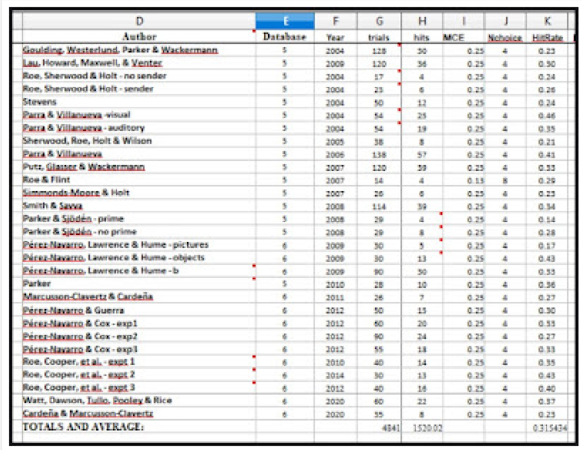
But what happens if you are lucky enough to have a spreadsheet program on your computer, and you can download the spreadsheet, and view the experimental data? Then you *still* won't get the key number of the average "hit rate" reported by the meta-analysis. For the spreadsheet table doesn't include a line summarizing the results in the table.

But by using some hard-core geeky tricks, we can remedy this situation. You have to do this (something that would not occur to 1 reader in 100):

- In cell G115 of the spreadsheet, type this: =SUM(G2:G114)
- In cell H115 of the spreadsheet, type this: =SUM(H2:H114)
- In cell K115 of the spreadsheet, type this: =AVERAGE(K2:K114)

Now *finally*, we get the "bottom line" numbers, shown in the last line of the screen shot below. From 1974 to 2020 there were 113 ESP experiments using the Ganzfeld protocol, which involved a total of 4841 trials and 1520 successful "hits," which was an average success rate of 31.5%, much higher than the rate expected by chance, which is only 25%.

- Don't Be Fooled: Well-Trained Chatbots Aren't Minds
- What the Neuroscientist Should Have Said When Asked About Mind Uploading
- Cognitive Effects of Epilepsy Surgery Clash with "Brains Make Minds" Dogma
- Evolution Does Not Explain DNA, DNA Does Not Explain Bodies, and Bodies Do Not Explain Minds
- "Brain Chemical Imbalance" Theory Is Fading Out as an Explanation for Mental Illness
- Why Plasticity and Neurogenesis Fail to Explain Minds That Work Well After Massive Brain Tissue Loss
- They're Calling It a Huge Memory Research Fraud, But Is It Only the Tip of the Iceberg?
- So Much Misleading Talk Occurs in Claims of a Scientific Consensus
- Shrink-Speaking About a Mere "Problem of Consciousness" Is As Wrong As Shrink-Speaking About a Mere "Problem of Human Shape Origination"
- Longtermism Is Fueled by a Goofy Belief in Computer-Generated Lives
- Given Their Narrow Studies and Slim Narrow PhD Dissertations, Why Are We So Swayed by Neuroscience PhDs?
- Some of the Weak Papers Neuroscientists Cite As Evidence for Their Chief Claims
- For Insight About Your Brain and Mind, Ponder the Never-Founds
- TV Medical Dramas Give Us Wrong Ideas About Minds and Death
- Brain Imaging Shows No Appreciable Neural Correlates of Memory Activity
- The Evidence Inversion Syndrome Blights Academia
- Poorly Designed Brain Scan Experiments Needlessly Put the Needy at Risk
- Science Literature Is Full of Misleading Claims About Brain Waves
- The US Government's False Claims About DNA
- If Neuroscientists Acted Like Cosmologists, They Might Say You Have an Invisible "Dark Brain"
- Exceptionally Fast Thinking Cannot Be Explained by Slow Brains Like We All Have
- Scientists and Clergy Have Much in Common
- 30 Things That Would Never Occur If Prevailing Neuroscientist Dogmas



D	E	F	G	H	I	J	K
Author	Database	Year	trials	hits	MCE	Nchoice	HitRate
Goulding, Westerlund, Parker & Wackermann	5	2004	128	30	0.25	4	0.23
Lau, Howard, Maxwell, & Venter	5	2009	120	36	0.25	4	0.30
Roe, Sherwood & Holt - no sender	5	2004	17	4	0.25	4	0.24
Roe, Sherwood & Holt - sender	5	2004	23	6	0.25	4	0.26
Stevens	5	2004	50	12	0.25	4	0.24
Parra & Villanueva -visual	5	2004	54	25	0.25	4	0.46
Parra & Villanueva - auditory	5	2004	54	19	0.25	4	0.35
Sherwood, Roe, Holt & Wilson	5	2005	38	8	0.25	4	0.21
Parra & Villanueva	5	2006	138	57	0.25	4	0.41
Putz, Glasser & Wackermann	5	2007	120	39	0.25	4	0.33
Roe & Flint	5	2007	14	4	0.13	8	0.29
Simmonds-Moore & Holt	5	2007	26	6	0.25	4	0.23
Smith & Savva	5	2008	114	39	0.25	4	0.34
Parker & Sjödén - prime	5	2008	29	4	0.25	4	0.14
Parker & Sjödén - no prime	5	2008	29	8	0.25	4	0.28
Pérez-Navarro, Lawrence & Hume - pictures	6	2009	30	5	0.25	4	0.17
Pérez-Navarro, Lawrence & Hume - objects	6	2009	30	13	0.25	4	0.43
Pérez-Navarro, Lawrence & Hume - b	6	2009	90	30	0.25	4	0.33
Parker	5	2010	28	10	0.25	4	0.36
Marcusson-Clavertz & Cardeña	6	2011	26	7	0.25	4	0.27
Pérez-Navarro & Guerra	6	2012	50	15	0.25	4	0.30
Pérez-Navarro & Cox - exp1	6	2012	60	20	0.25	4	0.33
Pérez-Navarro & Cox - exp2	6	2012	90	24	0.25	4	0.27
Pérez-Navarro & Cox - exp3	6	2012	55	18	0.25	4	0.33
Roe, Cooper, et al. - expt 1	6	2010	40	14	0.25	4	0.35
Roe, Cooper, et al. - expt 2	6	2014	30	13	0.25	4	0.43
Roe, Cooper, et al. - expt 3	6	2012	40	16	0.25	4	0.40
Watt, Dawson, Tullo, Pooley & Rice	6	2020	60	22	0.25	4	0.37
Cardeña & Marcusson-Clavertz	6	2020	35	8	0.25	4	0.23
TOTALS AND AVERAGE:			4841	1520.02			0.315434

Why haven't our meta-analysis authors communicated to us this very clear "bottom line" result, which anyone can understand is a result that is extraordinarily unlikely to have occurred by chance? Why have they only informed us of their results using only an "effect size" that few layman understand? It is as if the authors were doing everything they could to obscure the evidence for ESP they have found. Indeed, the authors have failed to even use any of the terms commonly used for describing ESP experiments. They have not used the words commonly used in the literature, words such as "psi," "ESP," "extrasensory perception," "telepathy," "clairvoyance" or "mind reading." Instead they have merely used the vague term "anomalous perception," as if they were trying to minimize the number of times their meta-analysis would be found by people doing a Google search for information about ESP.

Although some of the people gathering such evidence are clumsy about clearly communicating their impressive results, the experimental evidence for extrasensory perception is very strong and very well-replicated. Using the Ganzfeld technique, ESP researchers have achieved a high-level of experimental replication. But the Ganzfeld results are by no means the best evidence for ESP. The best evidence consists of (1) earlier tests reported by people such as Rhine and Riess, in which some subjects reported results we would never expect any subject to get by chance even if every person in the world was tested for ESP every week (see here, here and here for examples); (2) two-hundred years of observational reports of clairvoyance, in which some subjects were vastly more successful than any person ever should have been by chance or coincidence (see here, here, here, here, here, here, here and here for examples).

No one has any neural explanation for how a brain could produce psi effects such as ESP. Evidence for ESP is fatal to the claim that the human mind is merely a product of the brain. This is why people who maintain that claim have again and again so stubbornly refused to admit the existence of ESP. They almost always take a "head in the sand" approach, simply refusing to examine the evidence on this topic. Such mindless non-scholarship is a very strong "red flag" suggesting their beliefs about the brain and mind are fundamentally wrong. Two of the biggest "red flags" you can have suggesting that someone's beliefs are dogma rather than scientifically warranted are (1) a refusal to seriously study a very large body of important observational reports relevant to such beliefs; (2) a frequent tendency to occasionally make untrue statements about factual matters related to your belief claims. Very many

Were True

- "Brains Make Minds" Models All Flunk a Large Brain Scan Study
- The Philosophy of Teleospiritism
- The Biggest Blunders of Theories Such as Integrated Information Theory
- Study Finds No Robust Link Between Brain Structure and Personality
- The Two Huge Mistakes Involved in Typical Talk of a "Hard Problem of Consciousness"
- Neuroscientists Keep Wrongly Assuming the Source of Something Must Be Near Its Observed Manifestations
- The Vague Unfounded Boasts of Biology Sound Like the Vague Unfounded Boasts of Astrophysics
- 8 Reasons for Doubting Claims of the Heritability of Intelligence
- Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"
- Exhibit A Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- Exhibit B Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- More Indications Scientists Don't Understand How a Brain Could Think or Remember
- Studies New and Old Fail to Show a Big Link Between Brain States and Minds

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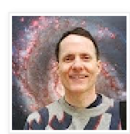

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March 2023 (2)

professors following the "brains make minds" dogma frequently display both of these "red flags."

Postscript: The 1961 book *Challenge of Psychical Research* by Gardner Murphy discusses some of the experimental evidence for ESP. Beginning on page 57, the author discusses a series of experiments he did with a student named Van Dam. The student was blindfolded, and put in a sealed cubicle in one room. In another room, someone chose by lot one of the squares in the grid below.

6	6	6	6	6	6	6	6
5	5	5	5	5	5	5	5
4	4	4	4	4	4	4	4
3	3	3	3	3	3	3	3
2	2	2	2	2	2	2	2
A	B	C	D	E	F	G	H

The blindfolded Van Dam was asked in the other room to guess the square chosen. There were 187 trials done on 7 different days. The expected result by chance was only 4 successes. The actual number of successes was 60, a success rate of nearly 30%. You would not expect a result half as good to ever occur by chance if every person in the world were to be tested.

The pages preceding page 75 discuss the Pearce-Pratt ESP experiment involving two people in different buildings. We read on page 75 there were 558 successes in 1850 trials, for a success rate of 30%, in a situation where the expected chance result was only 20% or 370 successes. The probability of getting such a result by chance was calculated at less than 1 in 10 to the twenty-second power, less that 1 in ten billion trillion.

at July 24, 2021 No comments:

Labels: ESP

Saturday, July 10, 2021

Most Scientists Don't Follow Formal Evidence Standards, Unlike Judges

The www.realclearscience.com site is a typical "science news" site: a strange mixture of hard fact, speculations, often-dubious opinions, spin, clickbait, hype and corporate propaganda, all under the banner of "science." I noticed an enormous contrast between one of the site's articles appearing yesterday, and another article appearing today.

The link that appeared yesterday was a link to a very give-you-the-wrong-idea article by scientist Adam Frank, one with the swaggering title, "The most important boring idea in the universe." This idea that Frank says is so important is the claim that "scientific knowledge" rests upon "mutually agreed standards of evidence."

Frank attempts to persuade us that after arguing for a long time, scientists agreed on "standards of evidence" that they are now faithfully following. He writes the following:

February 2023 (4)
January 2023 (5)
December 2022 (5)
November 2022 (4)
October 2022 (5)
September 2022 (4)
August 2022 (4)
July 2022 (5)
June 2022 (4)
May 2022 (4)
April 2022 (4)
March 2022 (5)
February 2022 (4)
January 2022 (4)
December 2021 (5)
November 2021 (3)
October 2021 (3)
September 2021 (2)
August 2021 (3)
July 2021 (3)
June 2021 (2)
May 2021 (3)
April 2021 (3)
March 2021 (4)
February 2021 (3)
January 2021 (3)
December 2020 (3)
November 2020 (3)
October 2020 (4)
September 2020 (3)
August 2020 (2)
July 2020 (2)
June 2020 (3)
May 2020 (2)
April 2020 (1)
March 2020 (1)
February 2020 (2)
January 2020 (1)
December 2019 (1)
November 2019 (1)
September 2019 (1)
August 2019 (1)
July 2019 (2)
June 2019 (1)
May 2019 (1)
April 2019 (1)
February 2019 (1)
January 2019 (1)
December 2018 (1)
November 2018 (3)

"There were lots of wrong turns in figuring out what counted as meaningful evidence and what was just another way of getting fooled. But over time, people figured out that there were standards for how to set up an experiment, how to collect data from it, and how to interpret that data. These standards now include things like isolating the experimental apparatus from spurious environmental effects, understanding how data collection devices respond to inputs, and accounting for systematic errors in analyzing the data. There are, of course, many more."

The idea that Frank tries to plant is a false one. Scientists never agreed upon some "standard of evidence" that would be used in judging how experiments or observations should be done or whether scientific papers should be published or publicized. There is no formal written "standard of evidence" used by scientists. Conversely, courts do actually make use of formal written standards of evidence.

When you go to www.rulesofevidence.org, you will find the Federal Rules of Evidence used in US federal courts. The page here lists about 68 numbered rules of evidence used in this evidence standard. Here are some examples:

- **Rule 404:** "Evidence of a person's character or character trait is not admissible to prove that on a particular occasion the person acted in accordance with the character or trait." (There are quite a few exceptions listed.)
- Rule 608: " A witness's credibility may be attacked or supported by testimony about the witness's reputation for having a character for truthfulness or untruthfulness, or by testimony in the form of an opinion about that character. But evidence of truthful character is admissible only after the witness's character for truthfulness has been attacked."
- Rule 610: "Evidence of a witness's religious beliefs or opinions is not admissible to attack or support the witness's credibility."

There are more than 60 other rules in the Federal Rules of Evidence. US Federal Courts have a formal written set of evidence standards. But scientists have no such thing. The impression that Frank has attempted to insinuate (that scientists operate under formal standards of evidence that they carefully worked out after long debate) is not correct.

There are no formal detailed written evidence standards in any of the main branches of science. In biology, poorly designed experiments following bad practices are extremely common. In theoretical biology and physics, it is extremely common for scientists to publish papers based on the flimsiest or wildest of speculations. When we read scientific papers such as those speculating about a multiverse consisting of many unobserved universes, we are obviously reading papers written by authors following no standards of evidence at all. It's pretty much the same for any of the thousands of papers that have been written about never-actually-observed things such as abiogenesis, dark matter, dark energy or primordial cosmic inflation.

In fields such as paleontology, elaborate speculation papers can be based on the flimsiest piece of ancient matter or the tiniest bone fragment; and many papers in that field are not based on specific fossils. Then there are endless chemistry papers not based on actual physical experiments but on "chemical reactions" merely occuring on paper, a blackboard, or inside a computer program. Countless papers in many fields are based on mere computer

Labels

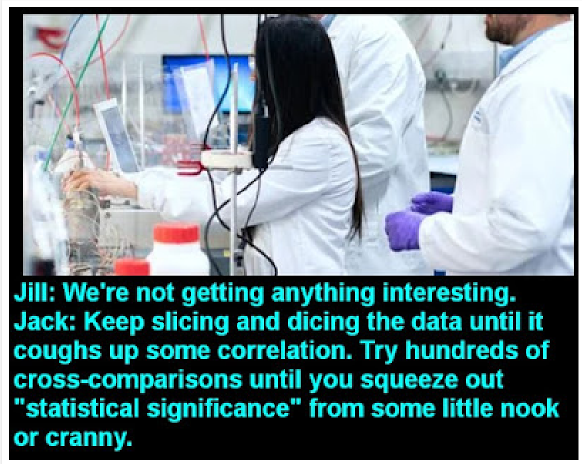
simulations or abstruse speculative math rather than physical experiments or observations.

On the next day after the www.realclearscience.com site published a link to Frank's article, it published a link to an article that very much contradicted his insinuations that scientists are adhering to sound standards of evidence. The link was to an article on www.reason.com entitled "How Much Scientific Research Is Actually Fraudulent?"

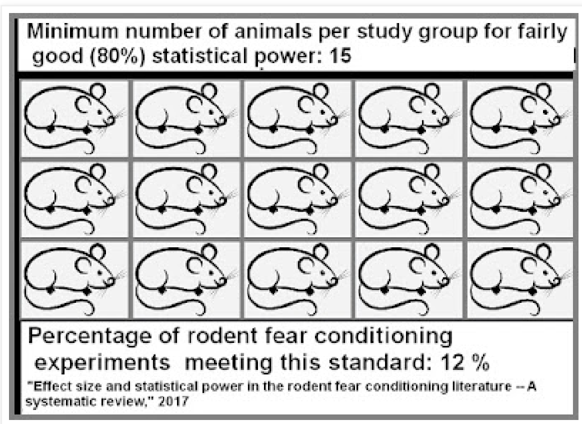
Here are some quotes from the article:

"*Fraud may be rampant in biomedical research. My 2016 article '*Broken Science*' pointed to a variety of factors as explanations for why the results of a huge proportion of scientific studies were apparently generating false-positive results that could not be replicated by other researchers. A false positive in scientific research occurs when there is statistically significant evidence for something that isn't real (e.g., a drug cures an illness when it actually does not). The factors considered included issues like publication bias, and statistical chicanery associated with* p-hacking, HARKing, *and* underpowered *studies....A 2015* editorial *in The Lancet observed that 'much of the scientific literature, perhaps half, may simply be untrue.' A 2015 British Academy of Medical Sciences report* suggested *that the false discovery rate in some areas of biomedicine could be as high as 69 percent. In an email exchange with me, Ioannidis estimated that the nonreplication rates in biomedical observational and preclinical studies could be as high as 90 percent....Summarizing their results, an article in Science* notes, *'More than half of Dutch scientists regularly engage in questionable research practices, such as hiding flaws in their research design or selectively citing literature. And one in 12 [8 percent] admitted to committing a more serious form of research misconduct within the past 3 years: the fabrication or falsification of research results.' Daniele Fanelli, a research ethicist at the London School of Economics, tells Science that 51 percent of researchers admitting to questionable research practices 'could still be an underestimate.'* "

Such comments are consistent with my own frequent examination of neuroscience research papers. When examining such papers, I seem to find that Questionable Research Practices were used most of the time. Almost always, the papers include study group sizes that are less than the reasonable standard of having at least 15 subjects in every study group, meaning there is a high chance of a false alarm. Most of the times, the papers fail to show evidence that any blinding protocol was used. The detailed elucidation and following of a rigorous blinding protocol is an essential for almost any experimental neuroscience study to be regarded as reliable. Few papers follow the standard of pre-registering a hypothesis and methods for data gathering and analysis, leaving the researchers free to follow an approach rather like "torture the data until it confesses" to what the researcher is hoping to find.



What this means is that the great majority of times you read about some neuroscience research on some science news site, you are reading about an unreliable result that should not be taken as robust evidence of anything.



Frank mentioned "best practices," trying to insinuate that scientists follow such practices. He fails to tell us about the large fraction of scientists that follow shoddy practices. Frank attempted to portray scientists as "follow strictly the good rules" guys acting like judges in a court. But it seems that a large fraction of scientists are like cowboys in the Wild West pretty much doing whatever they fancy. And so many of the gun blasts from such cowboys are just noise.

at July 10, 2021 No comments:

Labels: questionable research practices, scientist misconduct

Sunday, July 4, 2021

When You Read "It Is Widely Believed," Suspect a Dubious Belief Custom

We can classify several different types of scientific truth claims, along with some tips on how to recognize the different types.

Type of truth claim	How to recognize it

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

Citation of established fact	Typically occurs with a discussion of the observational facts that proved the claim.
Citation of a claim that is not yet established fact	Typically occurs with phrases such as “scientists believe” or “it is generally believed” or an appeal to a “scientific consensus.” The claim of a “scientific consensus” is often unfounded, and there may be many scientists who do not accept the claim.
Citation of a claim that has little basis in observations, and that there may be good reasons for doubting	Often occurs with a phrase such as “it is widely believed,” or maybe a more confident-sounding phrase like “it is becoming increasingly clear” or “there is growing evidence.”

Claims that memories are stored in synapses fall into the third of these categories. To show that, I may cite some of the many times in which writers or scientists suggested that memories are stored in synapses, and merely used the weak phrase "it is widely believed" as their authority.

- "It is widely believed that synaptic plasticity mediates learning and memory" (link).
- "It is widely believed that synapses in the forebrain undergo structural and functional changes, a phenomenon called synaptic plasticity, that underlies learning and memory processes" (link).
- "It is widely believed that synaptic modifications underlie learning and memory" (link).
- "As with other forms of synaptic plasticity, it is widely believed that it [spike-dependent synaptic plasticity] underlies learning and information storage in the brain" (link).
- "It is widely believed that memories are stored as changes in the number and strength of the connections between brain neurons, called synapses" (link).
- "It is widely believed that modifications to synaptic connections – synaptic plasticity – represent a fundamental mechanism for altering network function, giving rise to phenomena collectively referred to as learning and memory" (link).
- "It is widely believed that encoding and storing memories in the brain requires changes in the number, structure, or function of synapses" (link).
- "It is widely believed that long-term changes in the strength of synaptic transmission underlie the formation of memories" (link).
- "It is widely believed that the brain's microcircuitry undergoes structural changes when a new behavior is learned" (link).
- "It is widely believed that long-lasting changes in synaptic function provide the cellular basis for learning and memory in both

vertebrates and invertebrates (link).

- "It is widely believed that the brain stores memories as distributed changes in the strength of connections ('synaptic transmission') between neurons" (link).
- "It is widely believed that the long-lasting, activity-dependent changes in synaptic strength, including long-term potentiation and long-term depression, could be the molecular and cellular basis of experience-dependent plasticities, such as learning and memory" (link).
- "It is widely believed that a long-lasting change in synaptic function is the cellular basis of learning and memory" (link).
- "It is widely believed that the modification of these synaptic connections is what constitutes the physiological basis of learning" (link).
- "It is widely believed that memory traces can be stored through synaptic conductance modification" (link).
- "It is widely believed that memories are stored in the synaptic strengths and patterns between neurons" (link).
- "It is widely believed that long-term changes in the strength of synaptic connections underlie learning and memory" (link).
- "It is widely believed that long-term synaptic plasticity plays a critical role in the learning, memory and development of the nervous system" (link).
- "It is widely believed that learning is due, at least in part, to long-lasting modifications of the strengths of synapses in the brain" (link).
- "It is widely believed that long-term memories are stored as changes in the strengths of synaptic connections in the brain" (link).
- "It is widely believed that activity-dependent modification of synapses is the brain's primary mechanism for learning and memory" (link).
- "It is widely believed that synaptic modifications are one of the factors underlying learning and memory" (link).
- "Learning, it is widely believed, is based on changes in the connections between nerve cells" (link).
- "It is widely believed that memories are stored as changes in the number and strength of the connections between brain cells (neurons)" (link).
- "It is widely believed that memories are stored as changes in the strength of synaptic connections between neurons" (link).
- "It is widely believed that memory formation is based on changes in synapses" (link).

There is no good evidence that any memories are stored in synapses or stored through a strengthening of synapses or stored by a modification of synapse weights, or stored anywhere in the human brain through any means. No one has any understanding or any credible coherent theory of how learned information or episodic memories could ever be stored using synapses or any other part of the brain. We know of the strongest reason for rejecting all of the claims in the bullet list above, which is that the average lifetime of the proteins in synapses is only about two weeks or less. The proteins in synapses last an average of only about a *thousandth* of the longest length of time that humans can remember things (50 years or more). Moreover, humans can form permanent new memores instantly, which could never occur if forming such memories required synapse strengthening (something that would take minutes or hours, because it would require the synthesis of new proteins).

The examples in the bullet list above are simply an example of a speech custom. Scientists and science writers have got in the bad habit of saying something like "it is widely believed that memory formation occurs through changes in synapses." The fact that such a large fraction of the writers repeating this myth use the same language phrasing (including the phrase "it is widely believed") shows that what is going on is mainly people parroting what other people have said, rather than independently reaching intelligent judgments based on facts. I may note that in not a single one of these cases has any of these writers even claimed a scientific agreement, or even a majority of scientist opinion. Claiming that something is "widely believed" is to make a claim much weaker than claiming "almost everyone believes" or "most people believe." When people haven't got much of a case, they use phrases like "it is widely believed."

In general, when you hear or read someone using the phrase "it is widely believed," you should suspect a dubious belief custom or a misguided belief. For example, if someone says "it is widely believed you can't trust men from that country," he is saying something that means very little. And if someone says, "it is widely believed that the thirteenth day of the month is unlikely," you are probably just hearing an old wives tale. Because they all use the weak shaky phrase "it is widely believed," every statement in my bullet list above should be treated as a "red flag" indicating a lack of good evidence.

at July 04, 2021 No comments:

Labels: synapse theory of memory

Thursday, June 17, 2021

Neuroscientists Keep Using Misleading Coloring in Brain Visuals

In my July 2018 post "The Brain Shows No Sign of Working Harder During Thinking or Recall," I looked at quite a few brain scan studies looking for neural correlates of thinking or recall, and showed how such studies show no evidence that brains work harder when you are thinking or remembering anything. Below I will discuss some other studies not listed in that post, studies looking for signs of increased activity when a person is engaging in some kind of recall, recognition or heavy thinking.

- A study published in November 2018 was entitled "BOLD Activity During Correct-Answer Feedback in Cued Recall Predicts Subsequent Retrieval Performance: An fMRI Investigation Using a Partial Trial Design." Some fMRI scans were made of dozens of subjects during a verbal recall task. Figure 4 of the paper shows a graph displaying signal changes of no greater than about .3 percent. This is about 1 part in 1000, no greater than we would expect to see by chance. The results are quite consistent with the claim that memories are not stored in brains. No significant sign has been found that brains act differently during recall.

- An August 2020 paper was entitled "Aging alters neural activity at event boundaries in the hippocampus and Posterior Medial network." Hundreds of subjects were shown a movie and had their brain scanned. Ignoring Figure 1, which doesn't deal with recall, and looking at Figure 2, which does deal with recall, we see that the average signal change was only about 1 part in 1000, and that the greatest reported signal change (in the highest outliers) was only about 1 part in 300. No significant sign has been found that brains act differently during recall.
- A 2010 study not mentioned in my July 2018 post is the study "Age-related effects on the neural correlates of autobiographical memory retrieval." The study did brain scans of 14 young and 14 old people during recall of things that had happened in their lives. None of the results reported in the paper's graphs (such as Figure 1) show a percent signal change greater than 1 part in 1000. The results are quite consistent with the claim that memories are not stored in brains. No significant sign has been found that brains act differently during autobiographical recall.
- A January 2021 study was entitled "Neural correlates of recursive thinking during interpersonal strategic interactions." Figure 3 of the study shows no percent signal change greater than about 1 part in 300. The results are consistent with the idea that thinking is not produced by the brain, and no significant sign has been found that brains act differently during thinking.
- A 2018 study not mentioned in my July 2018 post is the study "Neural correlates of free recall of 'famous events' in a 'hypermnestic' individual as compared to an age- and education-matched reference group." The study scanned the brains of 11 people while recalling famous events. Figure 3 shows that the percent signal change was no greater than about 1 part in 500. The results are consistent with the claim that memories are not stored in brains. No significant sign has been found that brains act differently during recall of famous events.
- A 2015 study not mentioned in my July 2018 post is the study "Amygdala Activity During Autobiographical Memory Recall in Depressed and Vulnerable Individuals: Association With Symptom Severity and Autobiographical Overgenerality." We are told, "Sixty healthy control subjects, 45 unmedicated currently depressed individuals, 25 unmedicated remitted depressed individuals, and 30 individuals at high familial risk of developing depression underwent functional MRI while recalling autobiographical memories in response to emotionally valenced cue words." Figure 1 of the paper has a graph showing that the percent signal change was less than .2 percent, less than 1 part in 500. The results are consistent with the claim that memories are not stored in brains. No significant sign has been found that brains act differently during recall.
- A 2014 study not mentioned in my July 2018 post is the study "Mean signal and response time influences on multivoxel signals of contextual retrieval in the medial temporal lobe." Brain scans were done "while participants retrieved pair, spatial, and temporal source memories." 17 subjects had their brains scanned during such recall. Figure 3 shows that the percent signal change was less than .1 percent, less than 1 part in 1000. The results are consistent with

the claim that memories are not stored in brains. No significant sign has been found that brains act differently during recall.

- A 2019 study not mentioned in my July 2018 post is the study "Common and Distinct Functional Brain Networks for Intuitive and Deliberate Decision Making." The study is unable to show brain imaging evidence for brains causing thinking, because its graphs (Figures 4, 5 and 6) show no percent signal change greater than 1 part in 300.

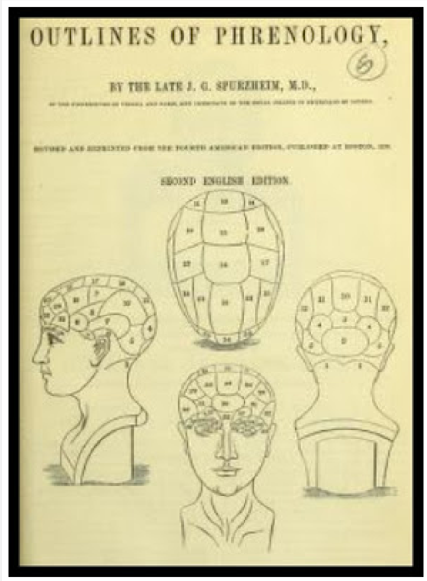
As we can see from examples like the ones above and the more numerous examples ones in my earlier post, brains look the same when you are doing nothing as they do when people are thinking hard, learning and remembering. So how is it that neuroscientists manage to create the impression that particular parts of the brain are more active during particular mental activities? They use two main tricks:

(1) The trick of wrongly using the words "activated" or "activation" when referring to differences in activity that are only about 1 part in 1000, the kind of difference you would expect to occur by chance. Such language is profoundly misleading. All parts of the brain are active at all times, and there is no appreciable effect of certain brain regions "turning on" during particular mental activities.
(2) The trick of visuals that depict brain activity differences of only about 1 part in 1000 in bright red, thereby suggesting a very big difference when there is only an extremely slight difference. You can read here about how such a trick is performed.

We can imagine a racist using similar coloring tactics to mislead us. Getting data showing negligible temperature differences between races of only 1 part in 1000, the racist might show us a diagram of different races, depicting some particular race with bright red heads, in an attempt to persuade us that the members of that race are "hot-headed" and prone to get angry.

Eye pupils vary by 500% under different light conditions, and heart rate differs by as much as 300% between resting and heavy exercise. That shows you that eye pupils are really involved in vision, and that hearts are really involved in supplying the body with blood. The thousand-times weaker variation in brain activity between mind resting and heavy mind activity does nothing to establish claims that brains produce thinking or that brains store memories.

The tricks and fallacies of those trying to prove that brains make minds are similar to the tricks and fallacies of the people who called themselves phrenologists in the nineteenth century. In that century, a system called phrenology was very popular. It was all based on the idea that particular mind functions and personality traits were concentrated in particular areas of the brain, and that you could tell something about a person's mind or personality by feeling little bumps on his head. If you click on the link here, you can find many long works attempting to prove this extremely erroneous idea. In fact, following that link will show that in its vast archives of old books www.archive.org has more than 500 books devoted to teaching the bunk that is phrenology. Most of the writers of such books thought they were teaching the "latest and greatest" neuroscience when they taught phrenology nonsense. A wiser future age will look back on the main papers of today's self-described "cognitive neuroscientists" the way we look back now on the phrenology volumes of the nineteenth century.



at June 17, 2021 No comments:

Labels: brain imaging, claims of neural correlates of mental activity

Thursday, June 3, 2021

Memory Recall Reality Versus the "We Can't Remember Well" Bunk of Professors

Nowadays it is as if many professors had an action principle of "degrade, debase, demean and dehumanize." In many ways, such professors attempt to portray human beings as so much less than they actually are. Below is a list of some of these ways.

- Many professors describe human beings as animals, an opinion that has no scientific warrant, as humans have many unique intellectual characteristics possessed by no other organism. There is no merit in claims that humans must be called "animal" on the basis that they must be placed in either an "animal kingdom" or a "plant kingdom." Organism classification schemes are arbitrary social conventions, and if scientists were to classify organisms in the most reasonable way, they should use three kingdoms for large organisms: a plant kingdom, an animal kingdom and a human kingdom.
- Many professors try to describe human beings as being "apes" or "ape-like." Such descriptions have no warrant in anything ever discovered. There is an ocean-sized gulf between the minds and behaviors of men and apes, so there is no reasonable basis for calling humans "apes" or "ape-like."
- Some professors teach the evil nonsense of free-will denial, thereby attempting to depict human beings as not possessing one of the most fundamental characteristics that they do possess.
- Very many professors deny evidence for paranormal phenomena, ignoring a vast mountain of evidence that humans can exhibit extrasensory perception and have neurally inexplicable spiritual experiences. This is another attempt to depict human beings as not possessing some of the fundamental characteristics that they do possess.

- Contrary to the reality that physically human beings are examples of gigantically organized systems more impressive from an engineering standpoint than anything humans have ever constructed, many professors will ignore such a reality, and describe a human body as something disorganized, perhaps calling a human body "some meat" or "a bag of chemicals" or "an accumulation of copying errors."
- Contrary to the reality that humans have a great diverse wealth of subtle intellectual powers such as imagination, insight, philosophical reasoning and esthetic appreciation, some professors may describe a human mentally as "just a stream of sensations" or "just a set of responses to stimuli."
- Against all evidence, many professors try to depict humans as being very forgetful creatures who cannot remember very well.

Very oddly, many of the people mentioned above describe themselves as "humanists." It would be more accurate to refer to such people as *dehumanists*. A dehumanist may be described as anyone who attempts to dehumanize human beings by depicting them as being less they are.

In all such cases, such dehumanizing professors speak like racists, but speak in a way worse than a racist speaks. A racist can be described as a person who attempts to degrade, debase, demean and dehumanize some particular group of humans, such as people with some particular ethnic background. Those who do the things listed above are doing something similar, but rather than attempting to degrade, debase, demean and dehumanize some particular race, they are attempting to degrade, debase, demean and dehumanize all humans.

The consequences of racism are the same as the consequences of dehumanization. When racists are in power, we may have things such as slavery or voting rights suppression or apartheid. When those who practice dehumanization are in power, we may have things like the bloody horrors of Stalinism that killed millions in senseless purges or gulags or the bloody horrors of Maoism that killed too many millions to be counted, or the Khmer Rouge regime in Cambodia that slaughtered millions. The man who believes that his fellow humans are "just animals" or "just apes" or "little more than apes" may happily slaughter such people, telling himself that his acts are little different from slaughtering animals for food.

The reasons behind most of the items on my list above are rather obvious. Professors advancing theories of natural human origins have the problem that there is a gigantic gulf between the mind and behavior of animals and the mind and behavior of humans. Having no credible explanation for how this gulf could have been crossed, all that professors can do is to distort the truth by trying to make this gulf look small. So their strategy is kind of "make the humans look like animals, and make the animals look like humans." Such a strategy cannot be pursued honestly, but only through deceptive language.

The reason behind the last item on my list above is not so obvious. Why would professors want to portray humans as creatures with weak memories who cannot remember well? We will find the answer when we consider the silly, featherweight ideas that professors advance to try to explain human memory. When asked to explain how a human is able to remember things, our professors will mutter phrases such as "synapse strengthening." They never explain how it is that a strengthening could cause the formation of a memory. The very idea of storing information by strengthening something makes no sense. When humans or computers store information, they may do it by writing something, but they don't do it by strengthening something.

The idea of memory formation by synapse strengthening involves a claim that a memory forms by repeated exposures, kind of the same way that a dent in your wall might form by you repeatedly punching the same spot over and over again. A person believing in this groundless idea is forced to believe that a memory must first appear in a very weak and fragile form, and can only persist after repeated strengthenings.

While new muscle skills may arrive in some way involving some type of strengthening, human learned information and episodic memories do not arise in such a way. Humans can instantly form life-long memories of things they have experienced only one time. Humans can learn new facts after being told them only one time. You did not need to have your teacher tell you on three different school sessions that Abraham Lincoln was killed when an assassin shot him while he was at the theater. You probably learned that fact the first time you were told it, and retained that memory since the time you learned it. Similarly, the first time you slipped on ice and fell flat on your face, you permanently learned that ice can cause humans to fall. You did not need three such experiences to learn that fact.

If memories arrived by synapse strengthening, that would be a very inefficient type of thing, resulting in poor or nonexistent memories of things you learned only once or long ago. Since the proteins in synapses have lifetimes of only a few weeks, we would expect that no memories would survive for very long if our memories were stored in synapses. Therefore, the professor advancing the dogma of memory formation by synapse strengthening is a person who will tend to believe that humans cannot remember things very well. Such a belief is contrary to all human experience, which is that humans can instantly form permanent new memories, and reliably remember them for 50 years or more.

An old man's remembrance of something that occurred 60 years ago

A recent experimental psychology paper illuminates how greatly the fantasy world of the dogmatic cognitive neuroscientist differs from the reality of human memory. A group of 68 memory scientists were asked this question:

"Imagine the following scenario: A healthy 30 year-old adult attends an audio-guided museum tour as part of a memory experiment. Memory for the tour is tested using free recall (i.e., the person says everything they can remember about the event) 48 hours later. For the following questions, an 'encoded detail' is a discrete bit of information that the participant heard and/or saw (e.g., a painting of a yellow sailboat). It does not refer to incidental or irrelevant information that was not attended (e.g., the floor tile was black). 'Accurate' refers to the factual correctness of recalled details (e.g., 'a painting of an orange sailboat' would be incorrect, if the sailboat was in fact yellow).

1) What proportion of encoded details would be freely recalled after 48 hours?
2) What proportion of these freely recalled details would be accurate after 48 hours?"

The same scientists were also asked: "Now, imagine the same scenario, but memory for the tour is tested (again using free recall) two years later." A Scientific American article discussing the study says this: "While recollections of these events were very good—more than 90 percent correct on average—the experts predicted they would be only 40 percent correct."

What we have here is a most gigantic failure of neuroscience theory to predict reality correctly. Based on silly, vacuous speculations about "synapse strengthening" being what causes memory retention, our neuroscientists have adopted the idea that human memory should be very weak and unstable. The reality is that human memory works vastly better than it would work if their theories are correct.

Proven to us by a large variety of common mental phenomena utterly beyond the credible explanation of neuroscientists, and also a vast reality of paranormal experience that has been well documented by credible observers for centuries, the reality of human souls is a reality as weighty as an ocean. Whenever a professor tries to make that reality disappear by the use of dehumanization rhetoric, it is like some little boy trying to make the ocean disappear by repeatedly filling his little plastic bucket with ocean water, and dumping that water on to the beach.

at June 03, 2021 No comments:

Labels: memory recall

Monday, May 24, 2021

A Soul Might Explain Instincts, but DNA and Brains Cannot

The discovery of DNA was one of the great triumphs of science. But ever since this discovery there has been a strange trend which we may call "DNA inflation," "DNA exaggeration," or even "DNA apotheosis." The trend has been to carelessly describe DNA in ever more grandiose terms, regardless of the actual facts. One of the central myths about DNA is the idea that it is some kind of blueprint for an organism. Another common claim is that DNA is a recipe (or a library of recipes) for making an organism. It is also sometimes claimed that DNA is like a computer program for generating our bodies.

But such statements are not warranted by the facts. Judging from the facts, we must conclude that while DNA uses a code of symbolic representations (the genetic code), DNA is not a blueprint for making a human, is not a recipe for making a human, and is not a program or algorithm for making a human.

There are several facts that dictate this conclusion:

1. DNA does not store information in some general purpose language in which complex body plans might be stated. DNA stores information using a minimal, stripped-down “amino acid” language capable of listing only the chemical ingredients (amino acids) that make up a protein. Other than the word “stop,” the only “words” that you can state in DNA are words such as tryosine, valine, proline, lysine and serine, words that specify amino acids. Given such a limitation, no one can explain how DNA could possibly contain a three-dimensional blueprint for a body or a list of instructions for constructing an organism.
2. If it were true that DNA had instructions for making the three-dimensional form of a body, we know of nothing below the neck of a female that would be capable of interpreting and understanding such instructions. Using 200 types of cells, each so complex and dynamic they have been compared to factories, the human body is a marvel of multi-level hierarchical organization, and is more physically complex than anything humans have ever constructed. Any instructions for making a human would be fantastically complex. Extremely complex instructions require something smart enough to interpret them, and just as there is nothing in a cell capable of interpreting something written in English, there is nothing in a womb that could be capable of understanding and executing three-dimensional assembly instructions if they were written in DNA. The idea that organisms arise because of a DNA blueprint is therefore a childish notion, like the notion that you could ride a balloon to the moon.
3. Despite cataloging the entire human genome, and exhaustively analyzing it, scientists have not discovered any part of DNA where a blueprint of the human body or a recipe for making humans is stored. For example, we have found no part in DNA where it specifies that humans should have two arms, two legs, ten fingers, ten toes and one neck; and we have found no part in DNA where it is specifies that heads and eyes should be rather round, or where it specifies the shape of the heart or the ear.
4. If body plans were stored in DNA, we would expect a human to have vastly more genes than much simpler organisms. But the opposite is often true; for example, humans have fewer than 25,000 genes, but the rice plant has between 32,000 and 50,000 genes.
5. The human genome is not big enough to store the body plan of a human, something that would require many more bytes than the mere 700 megabytes in human DNA.

So it is not true that a human baby develops from a fertilized egg because some instructions for making human are read from DNA. So how is it that morphogenesis occurs? How is it that a fertilized egg is able to progress to become a newborn baby? This is a great mystery of nature we do not at all understand. Such a mystery is an embarrassment to many types of thinkers, who want to think that biological life is something that has been pretty much figured out by scientists. Such thinkers will try to hide the fact that there is a gigantic secret of life we are quite ignorant about, and they will promote the incorrect idea that DNA is “the secret of life,” as if there were no gigantic secrets of biological life we don't understand.

There are actually six gigantic mysteries of life we do not understand:

1. The mystery of morphogenesis, of how a fertilized ovum manages to progress to become a newborn baby. The mystery is unsolved because DNA does not specify how to build a human being or any of its 200 types of cells.
2. The mystery of protein folding, the mystery of why newly formed linear sequences of amino acids (called polypeptide chains) form very rapidly into complex three-dimensional shapes needed for them to be functional.
3. The mystery of the origin of life.
4. The mystery of the origin of species and complex macroscopic biological functionality, which is not at all explained by the vacuous idea of random mutations and so-called "natural selection" (which is a misleading term because "selection" is a word referring to choice by an agent, and those who appeal to "natural selection" are referring to something that does not involve such choice).
5. The mystery of the origin of consciousness and higher mental functions.
6. The mystery of what causes organisms to have instincts.

Let us look at the question of instincts. Ever-prone to depict themselves as understanding things they do not understand, our scientists sometime suggest that we understand what causes instincts. They may suggest that instincts come from an animal's DNA. The idea is every bit as untenable as the idea that DNA contains instructions on how to build an organism.

Let us consider some examples of instinct. When a baby is born, it has an immediate urge to suck on its mother's breast. This is an instinct. But how could such a tendency ever be represented in DNA, which can only state groups of amino acids? There is no way in which DNA can express the shape of a breast or nipple, nor could it express any idea such as “move your mouth to this shape when you see it.”

Another instinct is the maternal instinct. Most mammals will have an instinct to protect their young. But how could such an instinct be expressed in DNA? Can we imagine, for example, that the DNA of a bear contains some little image of a bear cub, along with some type of message saying to protect this type of animal? Not at all, given the severe expressive limitations of DNA, something that is basically capable of listing only the chemical ingredients of proteins. A message such as “protect them” is utterly incapable of being expressed by the primitive “chemicals only” bare-bones language used by DNA.

In the animal world, we see many incredibly complex instincts. For example, spiders have instincts to build spider webs, bees have instincts to make complex hives, and some birds have incredibly complex instincts. According to one site, “The monarch butterfly makes a multigenerational 4000 mile annual trip in which descendants of the third or fourth generation know exactly where the first generation started.” Wikipedia.org tells us this:

"The monarchs begin their southern migration from September to October. Eastern and northeastern populations, up to 500,000 monarch butterflies, migrate at this time. Originating in southern Canada and the United States,

they travel to overwintering sites in central Mexico. The butterflies arrive at their roosting sites in November. They remain in their roosts during the winter months and then begin their northern migration in March. No individual butterfly completes the entire round trip. Female monarchs lay eggs for a subsequent generation during the northward migration. Four generations are involved in the annual cycle."

There is no plausible scenario by which such complex instincts could be represented in DNA. Nor can we explain such instincts by anything in a brain. Sometimes people appeal to "hardwiring" in a brain. No one has ever discovered any effect by which particular types of wiring in the brain can explain complex behavior. "You're hard-wired to do this" is usually just fantasy talk. The analogy of "hard-wiring" was stolen from the behavior of early electrical equipment. A particular arrangement of wires in early telephone switchboards might create one particular communication effect that would not occur under a different arrangement. There is no evidence that particular arrangements of wire-like axons in the brain explain particular behaviors.

Consider the case of sex and a human male. A typical young human male will have a very strong instinct to have sex with a human female. But about five percent of the human male population will have no such instinct. Instead, this five percent will have a strong desire to have sex with the male of the species. How can we explain this by imagining that the male instinct for sexual intercourse with females comes from DNA? We would have to imagine that some “do this” instructional information in 95% of males was not present in 5 % of the males. There is no genetic evidence that this is the case. Nor is there any evidence that the brains of homosexuals are wired differently than the brains of heterosexuals.

In humans the ability of an infant to quickly pick up the language of its parents may be considered an instinct. Linguist Noam Chomsky has stated the “poverty of stimulus” argument, that the exposure to language that an infant gets is very inadequate to explain how quickly the infant picks up language. Linguist and psychologist Steven Pinker wrote a book called *The Language Instinct*, but he presented little or no evidence that DNA can explain language acquisition. On this topic professor of linguistics Vyvyan Evans stated this:

"For a Universal Grammar to be hard-wired into the micro-circuitry of the human brain, it would need to be passed on via the genes. But recent research in neurobiology suggests that human DNA just doesn’t have anything like the coding power needed to do this. Our genome has a highly restricted information capacity. A significant amount of our genetic code is

taken up with building a nervous system, even before it gets started on anything else. To write something as detailed and specific as knowledge of a putative Universal Grammar inside a human infant's brain would use up huge informational resources – resources that our DNA just can't spare. So the basic premise of the language instinct – that such a thing could be transmitted genetically – seems doubtful."

Humans have innate language abilities that are very much like an instinct, but neither DNA nor brains explain this.

It is sometimes suggested that epigenetics might help explain instincts. Epigenetics is basically methyl molecules that attach to the outside of certain base pairs in DNA. But such molecules have all the same expressive limitations of DNA itself. There is no way in which behavior patterns can be expressed in either a genome or an epigenome.

The existence of instincts seems to be evidence for souls, not just in humans but in all animals that display instincts. If we imagine that an animal has a soul, we need not imagine that such a thing is some kind of blank slate. It may be that when particular types of souls start out in an organism, they have particular types of inclinations. Such soul characteristics may be the root cause of instincts.

DNA cannot explain instincts, and since current ideas of so-called natural selection depend on the idea of a change in genomes, natural selection also fails to explain instincts. As Gustave Geley stated in his very erudite book *From the Unconscious to the Conscious*, "Now the origin of instincts is no more explicable by natural selection or by the influence of the environment than the formation of species."

at May 24, 2021 No comments:

Labels: instincts

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Head Truth

The huge case for thinking minds do not come from brains

Friday, May 14, 2021

If The Brain Had a Memory Storage Code, We Would Have Found It Long Ago

One of the dogmas of modern biologists is that memories are stored in the brain. No one has ever produced any direct evidence establishing this claim, and there are many strong reasons for disbelieving it. One of these reasons is the lack of any plausible theory that explains how humans are able to instantly remember specific pieces of information when given some prompt such as the photo of someone's face or that person's name. Another reason is that there is no plausible theory that explains how humans could remember things for 50 years, such as humans can. The most popular theory of memory storage is that memories are stored in synapses, but we know that the proteins in synapses have short lifetimes, and they last for less than a month. No one has given a credible explanation of how memories could be stored for 50 years in synapses if there is such high protein turnover in synapses.

But despite these very grave difficulties, our neuroscientists keep telling us that our memories are stored in the brain. Neuroscientists do not claim that this alleged act of memory storage is some simple flow like the flow that occurs when you pour milk from your milk carton into your cereal bowl. Instead, neuroscientists claim that something called "encoding" occurs. We are told that the things we learn or experience are somehow translated into neural states, perhaps by some process that involves chemicals, electricity, or microscopic changes in the brain. But no neuroscientist has ever given anything resembling an exact description of how this encoding could occur.

The wikipedia.org article on "Encoding, memory" tells us that "The process of encoding is not yet well understood, however key advances have shed light on the nature of these mechanisms." But no such advances have actually occurred. The article then mentions "the modification of neural synapses, modification of proteins, creation of new synapses, activation of gene expression and new protein synthesis." But none of these things shed any light on how human experiences or learned concepts could ever be encoded as neural states, chemical states or electrical states. The wikipedia article in question gives us only bluffing and digressions, without doing anything to convince us that scientists have any understanding of how memories could be encoded as neural changes, chemical changes or electrical changes.

One reason for doubting that memories are encoded in brains is that such a thing would require for there to exist (still undiscovered) a set of encoding protocols so complex that they would be a miracle of design if they existed. Encoding always requires some set of translation rules. For example, human DNA uses a set of translation rules called the genetic code to encode

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information; American writers use the encoding protocols of the English language and the alphabet to encode information stored on paper; and computers use the encoding protocol known as the ASCII code to encode information stored in a computer. As argued here, it would seem that a brain could only store memories if it used a whole series of encoding protocols far more complex than the ASCII code or the genetic code; and the origin of so many sophisticated protocols would be impossible to naturally explain.

Consider only a few of the types of things that can be stored in a human memory:

- Memories of daily experiences, such as what you were doing on some day
- Facts you learned in school, such as the fact that Lincoln was shot at Ford's Theater
- Sequences of numbers such as your social security number
- Sequences of words, such as the dialog an actor has to recite in a play
- Sequences of musical notes, such as the notes an opera singer has to sing
- Abstract concepts that you have learned
- Memories of particular non-visual sensations such as sounds, food tastes, smells, pain, and physical pleasure
- Memories of how to do physical things, such as how to ride a bicycle
- Memories of how you felt at emotional moments of your life
- Rules and principles, such as “look both ways before crossing the street”
- Memories of visual information, such as what a particular person's face looks like

How could all of these very different types of information ever be translated into neural states or synapse states so that a brain could store them? If such encoding were to occur, it would be a miracle of complex design. Very oddly, the same people who tell us (without any sound basis) that such an encoding occurs are the same people denying design in biological organisms.

There is another very strong reason for doubting that memories are encoded in the brain: if the brain used a system of memory encoding, we would have already discovered direct evidence of such a code; but we have not discovered any such thing. Specifically:

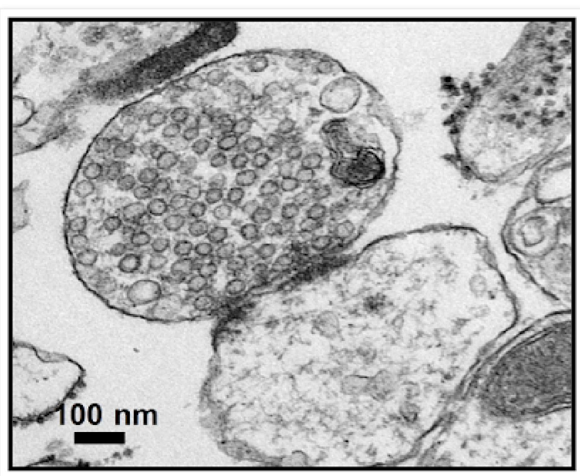
1. If brains actually stored encoded information, we would see regularities and repetitions that would be signs of encoded information, such as we see in the nucleotide base pairs of DNA, where encoded information is stored; but we see no signs of any such repetitions or regularities that might be the hallmarks of encoded stored memories in the brain.
2. If brains actually stored encoded information, there would have to be many genes that support such encoding, such as the hundreds of genes that support the transfer RNA molecules needed to carry out the protein encoding used by DNA and the genetic code; but we see no signs of any such memory-encoding genes in the human genome.

Let me explain the first of these points. Encoded information has regularities and repetitions that allow someone to tell that it is encoded information. For example, before Europeans were able to read hieroglyphics, they were sure that it was some type of encoded information, because of the large amount of repetition of symbols. When scientists first started to unravel DNA, they quickly figured out it was some type of encoded information, because there was a very high amount of symbol repetition. If we were to get radio signals from intelligent extraterrestrials, it might be years before we would be able to decipher such signals. But soon after we received signals, we would at least be able to tell that they were from intelligent beings and the signals contained encoded information, because of the great number of regularities and repetitions we would see in the signals.

It therefore stands to reason that if some part of the brain (other than DNA) contained encoded information, we would be able to see physical evidence of such an encoding. When scanning neurons and synapses with our electron microscopes, we would see regularities and repetitions that would be the sign of encoded information. But we see no such thing. If you look here, you can see electron microscope photographs of tiny synapses smaller than a neuron. You will see no sign of anything that looks like encoded information. Advanced chemical analysis also have shown no signs of anything that had the regularities and repetitions that are the hallmarks of encoded information.

Some may claim that the brain has encoded memory information, but that it's just too tiny for us to see. Such a claim has little credibility. Scientists were able to discover the microscopic encoded information in DNA in the 1950's. Can we believe that 65 years later science and medical technology is not advanced enough to discover encoded memory information in the brain?

We know exactly what is in synapses, because we can view them with very high-resolution electron microscopes. Below we see a 2013 close-up electron microscope photograph of a synapse head, from the Okinawa Institute of Science and Technology (link). At the bottom we see a unit that has a length of 100 nanometers (billionths of a meter).



There is no sign of any encoded information in such synapses. We see none of the symbol repetition or token repetition that is a sign of encoded information. The little round things are balls of chemicals called vesicles. The vesicles are almost all the same size and shape. The vesicles are not stable, and travel across the dark line shown in the center of the photo (which is called a synaptic gap), as a nerve impulse travels. No one has credibly proposed any method by which such vesicles could represent stable encoded information. If we were to look at the same synapse head the next day, the arrangement of vesicles would be much different. Synapses bear no resemblance to any system for storing permanent learned information or long-term memories lasting for years. Synapses no more resemble a system for storing encoded information than do the snow drifts outside of a house in Alaska.

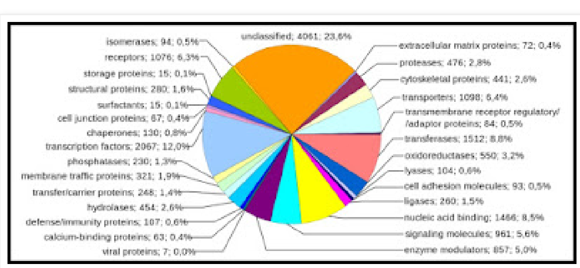
There is another place that we would expect to see a large sign of a neural code for memories if it existed. If such a thing existed, we would expect that there would be genes supporting such a facility. But no such genes have been found.

Let's consider a comparatively simple case of encoded information stored in the body, the case of the encoded information in DNA. DNA mainly consists of nucleotide base pairs, and particular combinations of such pairs represent particular amino acids. This very simple type of use of encoded information requires hundreds of genes, what are called tRNA genes.

If human brains were to actually be translating thoughts and sensory experiences so that they can be stored as memory traces in the brain, such a gigantic job would require a huge number of genes – probably many times more than the 500 or so "tRNA" genes that are used for the very simple encoding job of translating DNA nucleotide base pairs into amino acids. But we see no sign of any such memory encoding genes in the human genome.

There is a study that claims to have found possible evidence of memory encoding genes, but its methodology is ridiculous, and involved the absurd procedure of looking for weak correlations between a set of data extracted from one group of people and another set of data retrieved from an entirely different group of people. See the end of this post for reasons we can't take the study as good evidence of anything. There is not one single gene that a scientist can point to and say, “I am sure this gene is involved in memory encoding, and I can explain exactly how it works to help translate human knowledge or experience into engrams or memory traces.” But if human memories were actually stored in brains, there would have to be many hundreds or thousands of such genes.

The pie chart below shows human proteins by function:



This is a Wikipedia Commons file, and the page for the file gives the following table with the data used for the chart:

Function	Number of genes	Percent of genome

- Why Brains Are Not Suitable for Storing Long Sequences Like Humans Remember
- Why Brain Scans Don't Show Brains Make Minds
- Why Strokes, Alzheimer's Disease and Drunkenness Don't Prove the “Brains Make Minds” Dogma
- Synaptic Density Studies Contradict the Most Popular Memory Theory
- The Rare "Total Recall" Effect That Conflicts with Brain Dogmas
- Physical Connections Do Nothing to Explain Cognition
- The Sociological Reasons Why Bad Explanations Persist in Academia
- Split-Brain Cases Conflict with "Brains Make Minds" Dogma
- Why So Much of Neuroscience News Is Unreliable
- An Analogy Clarifying Why the "Brain Stores All Your Memories" Dogma Is Untenable
- Why Darwinism Fails to Explain the Human Mind
- What Is It That a Brain Does?
- Cloud Computing and a Non-Local Model of Consciousness
- Why We Do Not Understand the Origin of Complex Biological Innovations
- Our Minds May Arrive Top-Down Not Bottom-Up
- Fancy New Technology Fails to Prove Memory Dogmas
- The Argument for Determinism Collapses Once We Discard the "Minds Come from Brains" Dogma
- Animal Experiments Conflicting with the Dogma That the Brain Stores All Memories
- Memory Recall Reality Versus the "We Can't Remember Well" Bunk of Professors
- Neuroscientists Keep Using Misleading Coloring in Brain Visuals
- Most Scientists Don't Follow Formal Evidence Standards, Unlike Judges
- Experimental Evidence for ESP Is Well-Replicated
- Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades
- NIH Bets $1,434,188 That Synapses Don't Store Memories
- A New Case of Very Large Brain Damage and Normal Mental Function
- When Clue-Blind Professors Ignore All the Signs

extracellular matrix protein	72	0.40%
protease	476	2.80%
cytoskeletal protein	441	2.60%
transporter	1098	6.40%
transmembrane receptor regulatory/adaptor protein	84	0.50%
transferase	1512	8.80%
oxidoreductase	550	3.20%
lyase	104	0.60%
cell adhesion molecule	93	0.50%
ligase	260	1.50%
nucleic acid binding	1466	8.50%
signaling molecule	961	5.60%
enzyme modulator	857	5.00%
viral protein	7	0.00%
calcium-binding protein	63	0.40%
defense/immunity protein	107	0.60%
hydrolase	454	2.60%
transfer/carrier protein	248	1.40%
membrane traffic protein	321	1.90%
phosphatase	230	1.30%
transcription factor	2067	12.00%
chaperone	130	0.80%
cell junction protein	67	0.40%
surfactant	15	0.10%
structural protein	280	1.60%
storage protein	15	0.10%
receptor	1076	6.30%
isomerase	94	0.50%
unclassified	4061	23.60%
Total	**17209**	**100.00%**

Notice that there is no mention at all of any such category as "memory encoding proteins," nor any mention of "memory storage proteins" nor any mention of "memory retrieval proteins." The 15 proteins listed as "storage proteins" have nothing to do with memory storage. The wikipedia.org article on storage proteins describes them merely as "biological reserves of metal ions and amino acids."

If human episodic memories and human learned knowledge were to be translated into brain states, such a marvel of translation would require a massive number of proteins dedicated to such a task. But no such proteins have been discovered or identified.

Let's imagine a woman named Joan who is dating a man named Jack. Jack claims that he's one of the nation's most successful corn farmers. But one day

- Why Neuroscience Hasn't Delivered for Psychiatry
- Panpsychism Arguments Involve an Equivocation Fallacy
- He's Strangely Seeking Memories in Cells Below the Neck
- Just Call Them "Machine-Metaphor-Misguided"
- Way Off in Their Predictions, Neuroscientists Keep Misdescribing Human Memory Performance
- The Biggest Brain Projects Are Still Failing to Support Prevailing Brain Dogmas
- A New Paper Reminds Us Neuroscientists Can't Get Their Story Straight About Memory Storage
- NSF Grant Tool Query Suggests Engrams Are Not Really Science
- Suspect Shenanigans When You Hear Claims of "Mind Reading" Technology
- No, a USC Team Did Not Show "How Memories Are Stored in the Brain"
- Why ESP Discredits the "Brains Make Minds" Claim
- Beware of Neuroscientists Using Cell Nicknames
- The Press Often Gives Us Fake News About Brains
- No Solid Principle Justifies "Brains Make Minds" Thinking
- "Thousands of Participants Are Needed for Accurate Results," But Most Brain Scan Studies Don't Even Use Dozens
- Why the Academia Cyberspace Profit Complex Keeps Giving Misleading Brain Research Reports
- "Brains Make Minds" Idea Flunks an Audit of a Large Brain Scan Database
- Big Study Finds Brain Gray Matter and Cortical Thickness Peak at Age 6 or Earlier, Contradicting Brain Dogmas
- Why the "A Memory Is Stored Throughout the Brain" Idea Makes Things Much Worse
- Principles of a Post-Materialist Science
- EEG Studies Fail to Provide Robust Evidence That Brains Think or Retrieve Memories
- Seven Things in Fast Retrieval Systems, None of Which Your Brain Has
- Studies Debunk Hippocampus Memory Myths
- 11 Authorities Seem to Realize That "Your Brain Is a Computer" Is a Junk Metaphor

Joan notices something very suspicious. At Jack's home there are no signs of any of the things that Jack would need to have to be a successful corn farmer. Joan notices that Jack's home merely has a modest back yard, and does not have any large field for growing corn. Joan notices that Jack does not own a tractor for planting corn or any other piece of farming equipment, and that in Jack's garage there are no signs of anything like food storage bins or seed sacks. Joan should suspect that Jack is not telling the truth when he claims to be one of the nation's most successful corn farmer.

Jack is similar to neuroscientists, and Jack's home and land is similar to the human brain. The human brain does not have the things it would need to have if the neural memory storage claims made by neuroscientists are correct. If it were true that the human brain stored memories, the human brain would need to have all of the following things:

- Some specialized physical biology in the brain capable of writing memories.
- Some specialized physical biology in the brain capable of reading memories.
- Some specialized physical biology in the brain capable of reliably storing memories for decades.
- Some specialized physical biology in the brain capable of retrieving memories instantly based on the most fragmentary hints.
- A huge number of proteins in the human body dedicated to accomplishing the incredibly difficult task of translating human episodic memories and human learned information into neural states or synapse states.

None of these things exist in the human brain. So the claims of today's neuroscientists are very much like the claims of Jack, claims that are contrary to the physical facts. Just as Jack's home bears no resemblance to a very successful corn farm, the human brain bears no resemblance to a device for permanently storing and instantly retrieving learned information.

at May 14, 2021 6 comments:

Labels: memory encoding

Thursday, May 6, 2021

The Promissory Notes of Materialist Professors Are Long Past Due

"The elite struggling to maintain its power is embodied now in our educational institutions - our universities, in particular. The academic bureaucrats are the greatest beneficiaries of the mechanistic myth, as this myth affords them a privileged position in society regardless of whether their activities are useful or not. So it is not surprising to see them defend the mechanistic ideology as fiercely as the church was defending earlier the religious one. …Today, mechanism is important, so we continue to trust and respect the academic bureaucrats even as the mechanistic theories are failing. As we will see in the following chapters, it is quite easy to prove that these theories are fraudulent; and yet we treat their defenders as scientists, not as charlatans. As part of its power, the academic elite controls education. And it has used this monopolistic position to turn the process of education into a process of indoctrination: all we are taught is what can be explained mechanistically. Thus, while promoting knowledge, intelligence, and

creativity, the academic elite has redefined these qualities to mean, not the utmost that human minds can attain, but merely the skills needed to follow the mechanistic ideology: knowledge of the latest mechanistic theories, the intelligence to appreciate the mechanistic principles, and the creativity to accomplish a task with mechanistic methods alone. Mechanism is not just practised - *it is* enforced.*"*

Andrei Sorin, *Sofware and Mind*, page 16

Let us imagine a young man named Rick who decides late in his seventeenth year to declare independence from his parents. That's an age when many a young man often becomes convinced that he is a genius, and that his parents are pretty much idiots. Suppose that at this time Rick declares that he no longer needs his parents for anything, and he can take care of things just fine by himself.

We can imagine that Rick might have to borrow lots of money to get through college, particularly if he wasn't quite the genius he imagined himself to be, and didn't get much of a scholarship. We can also imagine Rick continuing to borrow lots of money after leaving college. Looking forward a few years after his graduation, we can imagine Rick in a state of very serious debt. He has a big car loan to pay off, and very high amounts of money he has due on his credit cards. There are also his big college loans which he is having difficulty paying off.

Finding himself rather floundering with all of these debts outstanding, we can imagine Rick starting to tell some lies. To borrow more money to pay off his overdue debts, he might fill out new loan applications, and be untruthful in his statements on such loans. He might brag to his parents about his fancy car, telling them he's doing great, and failing to tell them about how he is long overdue on his debts. Rick might also resort to telling implausible tales to soothe those worried about his debts, such as saying, "My financial woes will be fixed once I sell that screenplay I'm writing, which I'll be able to sell for $500,000."

Rick might also engage in a kind of evidence avoidance, in which he avoids looking at things that might tell him that his plan to become all independently successful has not worked out. For example, he might avoid checking his credit rating on one of those online sites that tell you your current credit rating. And getting many bills from his creditors, Rick might stick them in his desk drawer unopened, to avoid being reminded of how things have not worked out as he hoped.

Were True

- "Brains Make Minds" Models All Flunk a Large Brain Scan Study
- The Philosophy of Teleospiritism
- The Biggest Blunders of Theories Such as Integrated Information Theory
- Study Finds No Robust Link Between Brain Structure and Personality
- The Two Huge Mistakes Involved in Typical Talk of a "Hard Problem of Consciousness"
- Neuroscientists Keep Wrongly Assuming the Source of Something Must Be Near Its Observed Manifestations
- The Vague Unfounded Boasts of Biology Sound Like the Vague Unfounded Boasts of Astrophysics
- 8 Reasons for Doubting Claims of the Heritability of Intelligence
- Widely Read Scientific Paper Asks, "What If Consciousness Is Not an Emergent Property of the Brain?"
- Exhibit A Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- Exhibit B Suggesting Scientists Don't Know How a Brain Could Retrieve a Memory
- More Indications Scientists Don't Understand How a Brain Could Think or Remember
- Studies New and Old Fail to Show a Big Link Between Brain States and Minds

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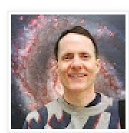

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March 2023 (2)

Eventually Rick might enter a kind of state we might "virtual bankruptcy." We may define this as a state in which you have no reasonable chance of paying off your debts, but you haven't yet officially declared bankruptcy. Virtual bankruptcy is often characterized by a kind of charade in which someone pretends to be doing very well financially, even though the actual situation is so bleak that a nasty "day of reckoning" is inevitable.

We may compare the path of materialist scientists to the path of Rick. Late in the nineteenth century, the community of academic scientists pretty much declared their independence from religion and philosophy. Religion was largely the parent of academic science, because so many of the universities had started out as religious institutions or institutions created for the purpose of promulgating religion. But around 1880 our professors started saying, "We don't need religion; we can do it all ourselves," rather like Rick declaring at 17 that he no longer needed any help from his parents.

Just as Rick piled up so many promissory notes, our materialist scientists piled up many promissory notes. These included the following:

- They had no understanding of how a brain could generate thought or understanding, but they promised that this would soon be revealed once the brain was more carefully studied. In 2005 one scientist stated, "I believe (I know—but can't prove!) that scientists will soon understand the physiological basis of the 'cognitive spectrum,' from the bright violet of tightly-focused analytic thought all the way down to the long, slow red of low-focus sleep thought—also known as 'dreaming.' "
- They had no understanding of how a brain could store memories, but they promised that such a mechanism would be found, and that memories would be found in brains like letters printed on the pages of a book.
- Being convinced that minds can be understood by material principles, they predicted with great confidence that intelligent computers would be invented by late in the twentieth century. For example, the most famous AI expert of his time (Marvin Minsky) said this in a 1967 book: "Within a generation, I am convinced, few compartments of intellect will be outside the machine's realm -- the problem of creating 'artificial intelligence' will be substantially solved." Similarly, a Herbert A. Simon predicted in

1965 that "machines will be capable, within twenty years, of doing any work a man can do."

- They had no understanding of how life could have naturally originated, but they promised this would be revealed once they learned more about chemistry. In 2006 a chemistry professor predicted, "We shall understand the origin of life within the next five years."
- They had a theory of natural biological origins that was radically lacking in the intermediate transitional fossils needed for it to be well-confirmed, but they promised that such fossils would be found.
- They had no understanding of how a tiny speck-sized human egg cell is able to progress to become a full-sized human being, but they promised that this would be revealed before long, after more progress was made in biology.
- They had no understanding of the universe's beginning, but they promised that some natural theory of the universe's past would appear, probably some theory of a universe that had existed forever.
- They predicted that all the neuroscience research would allow us to increase human intelligence and improve human memory. For example, in 2007 one neuroscientist said, "I am optimistic that human intelligence can be increased, and can be increased dramatically in the near future."
- They predicted many times starting about 1960 that on the grounds that the origin of life was easy or inevitable, and that Darwinian evolution was inexorable once life began, it followed that searches for radio signals from extraterrestrial civilizations would soon be successful.

It is now very long after such promises were made. But none of these promises has come true. Specifically:

- Despite well over a century of neuroscience study with increasingly powerful scientific instruments, we still have no idea of how a brain could generate thought or understanding.
- Despite well over a century of neuroscience study with increasingly powerful scientific instruments, there is still no understanding of how memories could be stored in brains, nor any physical evidence that they are stored in brains.
- Despite 70 years of origin-of-life experiments, scientists have made no real progress in understanding how life could naturally originate.
- The great wealth of intermediate transitional fossils promised has not been found, and there is still no understanding of how there could have occurred events such as the Cambrian Explosion, when almost all of the animal phyla appeared in a relatively short time.
- There is still no understanding of how a tiny speck-sized human egg cell is able to progress to become a full-sized human being, and the failure to find any sign of anatomy-building instructions in DNA has made this mystery all the more puzzling.
- Scientists have not established any theory of an eternal universe, and the theory they have of the universe's origin (the Big Bang theory, a theory of a sudden beginning to everything 13 billion

Labels

years ago) offers no explanation for how such a beginning occurred.
- Despite lavish funding for very many years, all attempts to detect radio signals from extraterrestrial civilizations have failed.
- Despite all the billions spent on neuroscience research, no one has been able to produce any device or medical technique for increasing human intelligence or expanding human memory.

Just as Rick's promissory notes became long overdue, the promissory notes of our materialist scientists are long overdue. And just as Rick began to lie to try to smooth over the crisis caused by his overdue debts, materialist scientists long ago started to lie to smooth over the crisis caused by the failure of their promises to materialize.

Such lies come in many forms:

- Having failed to find any blueprint for anatomy in human cells, or anything like a program or recipe for constructing a human body, many scientists told the big lie that the DNA molecule was such a thing (DNA actually contains only very low-level chemical information such as which amino acids make up a protein).
- Having failed to produce life through any artificial method, and having failed to even produce any of the building blocks of life (protein molecules) or even any of the building blocks of the building blocks of life (amino acids) through any experiment realistically simulating the early Earth, scientists repeatedly bragged about experiments merely producing the building blocks of the building blocks of life in experiments that did not realistically simulate the early Earth, trying to portray such defective experiments as some progress on origin-of-life research.
- Having failed to actually produce any such thing as artificial intelligence, the shortfall has been covered up by pitchmen simply using all over the place the words "artificial intelligence" or the equivalent acronym AI for what is merely computer programming that does not involve any such thing as understanding inside a computer.
- Groundless speculations about the origin of the universe were passed off as some progress in explaining how such a thing could have occurred.
- Poorly replicated and extremely dubious mouse experiments done with all kinds of procedural defects were passed off as progress in understanding a neural basis for memory.
- A never-plausible Darwinian theory of biological origins that was unproven was passed off as a great scientific success (despite its utter failure to credibly explain things Darwin knew nothing about such as a multitude of different types of fine-tuned protein molecules and the magnificent organization and purposeful-seeming biochemistry of cells), based on shoddy grounds such as the number of scientists who supposedly accept it or the academia speech custom of claiming that the theory was a triumph.

Just as Rick might have resorted to implausible tales to soothe those worried about his debts, our professors have resorted to ever-more-implausible tales to help soothe those worried about their explanatory failures. Such tales include a whole bunch of wild stories such as tall tales about monkeys rafting across the

Atlantic Ocean millions of years ago (designed to help explain fossils found in embarrassing locations), the tale that there is some infinity of other universes (lamely designed to try to help explain away evidence that our universe is fine-tuned for life), and the tale that thousands of different types of protein molecules each accidentally appeared by chance (each such event being as unlikely as a typing monkey producing a small working computer program).

Faced with mounting signs that things have not worked out as he hoped, Rick engaged in evidence avoidance such as failing to check his credit score, and sticking creditor bills in his desk drawer, unopened. Faced with mounting signs that reality does not work as they thought, materialist scientists often engage in similar evidence avoidance. They fail to seriously study the evidence for paranormal phenomena, evidence that shows their assumptions about reality are not correct. They also fail to study case histories and neuroscience findings that defy their assumptions about how reality works, such as cases of people who thought and remembered well after half of their brain was removed, and findings showing brains are too slow, noisy and unstable to account for human mental phenomena.

So where does scientific academia now find itself? We may call its current state a state of virtual bankruptcy. Just as a person in virtual bankruptcy has no hope of being able to fulfill his financial promises, and needs to undergo a drastic reordering of his affairs, scientific academia has no realistic hopes of fulfilling its promises, and needs to undergo a drastic reordering of its affairs. If Rick were to move from virtual bankruptcy to actual bankruptcy, he would need to do the equivalent of humbly saying something like, "I screwed up really bad, and now I need to make great changes to set my affairs in order." If the swollen heads in scientific academia were to do something equivalent, they would say, "We science professors screwed up really bad, and need to do a drastic reordering of our affairs and our publicly stated positions, to restore public confidence in our statements."

at May 06, 2021 2 comments:

Wednesday, April 28, 2021

Why a Brain Should Be Unable to Reliably Transmit Any Memory or Thought Signal

When neuroscientists attempt to describe electrochemical effects moving around in the brain, they describe it in terms of what is called an action potential. An action potential is an electrical change in a neuron which can be transmitted to other nearby neurons. Now, there is a related question very relevant to the issue of whether the brain can actually be the storage place of human memory or the source of human thought. This question is: can these action potentials make up reliable memory signals or thought signals that travel around in the brain? For example:

1. Could a brain retrieve some memory information stored in one part of a brain, and send that information reliably (as a kind of coherent signal) from one part of the brain to another part of the brain (perhaps from one part storing the information to another part more involved in attention or current thought)?
2. Could a brain send some information arising from thinking from one part of a brain to another part (something that would presumably be necessary for a brain to have complex thoughts combining simpler ideas)?

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

In previous posts on this site I have discussed a major reason for thinking that the answer to the first question must be: no. The reason is that information does not reliably transfer across the synapses that separate neurons. It has been established that action potentials only travel across synapses with a likelihood of about 50% or less (some estimates are as low as 10% or 20%). So if the brain tried to retrieve detailed information (such as a sentence of text) from one part of the brain to another, and each synapse transmitted an action potential with a likelihood of less than 50%, than the information would not be reliably transmitted.

In the brain, information would need to travel though very many synapses for even a short trip in the brain. What analogy can we give for such a setup, if each trip across a synapse occurs with low reliability? An analogy would be if I send an email from New York to Los Angeles, with the email passing through seven different computer servers, each of which transmits each particular character with a reliability of less than 50%. Under such a setup, it would be a lucky if a single word of my email got from New York to Los Angeles. There would be such message garbling and loss of characters that it would be a kind of like trying to read a pen-written message on a piece of paper that had gone through a washing machine seven different times.

There is another major reason for thinking that a brain should be unable to transmit any memory or thought signals. The reason is that most neurons have so many connections that there would be a signal overload preventing the reliable transmission of information.

Let us consider three different devices that effectively transmit information: a computer with a simple web browser, a radio and a television. There is one very important thing common to each of these inventions: each is arranged so that signals are received from only one source at a time. For example:

- A television set is arranged so that it can display TV signals from only one TV channel at a time.
- A radio is set up so that it can receive signals from only one radio station at a time.
- A computer with a simple web browser can display information from only one URL or web site at a time (let's ignore the not-so-simple web browsers that allow you to display different web sites in different tabs, and ignore the possibility of bringing up multiple instances of a web browser on the same computer).

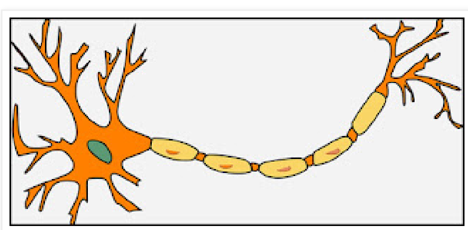
Now, let's imagine what chaos would result if these things were not arranged in such a way:

- If a television set were arranged so that it displayed TV signals from five or ten TV channels at the same time, you would see and hear such a confusion of pixels and sounds that you would not be able to understand or enjoy any of the channels.
- If a radio were set up so that it received signals from five or ten different radio stations at a time, you would probably get such a confusion of sounds you would not be able to understand or enjoy anything coming from the radio.
- If a computer used a web browser that displayed five or ten web pages all at the same time, the browser's screen would show such a confusion of pixels that you would not be able to understand anything.

For example, if your TV set displayed five stations at the same time, you might see something like the jumble below, which would not be coherent, intelligible information.

What we know about the physical arrangement of the brain tells us that the brain should suffer from the same type of problem described above. Since each neuron is bombarded with signals from many other neurons, most of which fire randomly, it should be impossible for neurons to accurately transmit thought or memory signals. It has been estimated that the average neuron has 7000 connections to other neurons. Every neuron should be like some malfunctioning TV set that picks up simultaneously 100 different TV stations at the same time, resulting in an incomprehensible jumble like the jumble shown above.

Below we see a diagram of a neuron. The yellow part is a myelinated axon, and the orange parts are dendrites.



For anyone who thinks that a neuron receives an "action potential" (AP) nerve signal only from an axon, the article here tells us the following:

"In fact, dendrites can be the site of AP initiation and propagation, and even neurotransmitter release. In several interneuron types, all functions are carried out by dendrites as these neurons are devoid of a canonical axon."

The wikipedia.org article on dendritic spikes tells us the following:

"In neurophysiology, a dendritic spike refers to an action potential generated in the dendrite of a neuron. Dendrites are branched extensions of a neuron. They receive electrical signals emitted from projecting neurons and transfer these signals to the cell body, or soma. Dendritic signaling has traditionally

been viewed as a passive mode of electrical signaling. Unlike its axon counterpart which can generate signals through action potentials, dendrites were believed to only have the ability to propagate electrical signals by physical means: changes in conductance, length, cross sectional area, etc. However, the existence of dendritic spikes was proposed and demonstrated by W. Alden Spencer, Eric Kandel, Rodolfo Llinás and coworkers in the 1960s[1][2] and a large body of evidence now makes it clear that dendrites are active neuronal structures. Dendrites contain voltage-gated ion channels giving them the ability to generate action potentials."

Given such realities, we can describe a neuron as being subject to the most severe signal overload, like some TV set that is getting 100 channels at once, or some radio picking up 100 stations at once. Given the physical arrangement of neurons in brains, there is no chance that memory signals or thought signals could be reliably transmitted by neurons. Given many signal-slowing factors discussed at length here, it should be impossible for signals to travel through the human cortex at much faster than a snail's pace. Yet humans can think and recall with the greatest speed and accuracy. This is shown by cases such as actors playing the role of Hamlet, who recall more than 4000 lines with perfect accuracy, and at high speed. It is also shown by calculation savants who do extremely complicated mathematical calculations in their mind very quickly with perfect accuracy.

There are many historical cases of math prodigies that could calculate with incredible speed and accuracy. The passage below describes the blazing fast and very accurate calculation powers of Zerah Colburn:

"This child undertook, and completely succeeded in, raising the number 8 progressively up to the sixteenth power. And in naming the last result, viz.: 281, 474, 976, 710, 656, he was right in every figure. He was then tried as to other numbers consisting of one figure, all of which he raised (by actual multiplication, and not by memory) as high as the tenth power, with so much facility and dispatch that the person appointed to take down the results was obliged to enjoin him not to be so rapid. With respect to numbers consisting of two figures, he would raise some of them to the sixth, seventh and eighth power....He was asked the square root of I06,929, and before the number could be written, he immediately answered, 327. He was then required to name the cube root of 268,336,125, and with equal facility and promptness he replied, 645. Various other questions of a similar nature, respecting the the roots and powers of very high numbers, were proposed by several of the gentlemen present, to all of which he answered in a similar manner. One of the party requested him to name the factors which produced the number 247,483: this he immediately did by mentioning the numbers 941 and 263 — which, indeed, are the only two numbers that will produce it...One of the gentlemen asked him how many minutes there were in forty-eight years; and before the question could be written down, he replied 25,228,800; and instantly added that the number of seconds in the same period was 1,513,728,000."

The passage below tells us about the incredibly fast and accurate calculation speed of Jacques Inaudi, born in 1867:

"In his exercises of mental calculation, Mr. Inaudi is remarkable in two particulars, the complexity of his work and the rapidity with which he completes it. The greater number of questions given to him contain many figures. He will add in his head two numbers consisting of twelve figures each ; he will multiply two numbers composed of eight figures ; he will tell

how many seconds there are in any promiscuously chosen number of years, months, days, and hours. These operations demand that he shall hold in his memory the exact problem and the partial solutions up to the time when the complete result is found. For such a considerable work as this, Mr. Inaudi gives an extremely short time, so short, indeed, as sometimes to produce the illusion of instantaneity. The following paragraph has been published concerning him. 'He adds in a few seconds seven numbers of eight or ten figures each; he subtracts one number from another each composed of twenty-one figures in less than a minute; he finds as rapidly the square root or the cube root of numbers consisting of from eight to twelve figures, if these numbers are perfect squares or cubes; it takes a little longer for the last-named work if there is a remainder necessitating a fractional part to the answer. He finds with incredible celerity the sixth or the seventh root of large numbers. He will multiply or divide in less time than it takes him to announce the results. As an example of what has been said, we give the following: He was asked the number of seconds in 18 years, 7 months, 21 days and 3 hours. The response was given in thirteen seconds.' "

The gap between the physical shortcomings of the brain and the realities of the most impressive human mental performance is like the gap between Earth and Jupiter. It is therefore foolish to continue the speech custom of saying that thinking and recall comes from brains, a custom that is an example of hollow hubris. It would be far wiser for us to say, "Humans have magnificent mental powers, and we don't know where they come from."

at April 28, 2021 No comments:

Labels: brain connectivity, memory recall, neural noise

Saturday, April 17, 2021

His Poor Strategy for Examining the Mind-Body Problem

John Horgan (long-time columnist for Scientific American) has a new book on the mind-body problem. You can conveniently read it for free at www.mindbodyproblems.com. Horgan has produced many words, but offers very little original insight on questions of mind and body.

I can think of some general approaches that might be fruitful in gaining some insight on the problem of mind and body. A good approach would be as follows:

First, make a very thorough study of long-made claims about the brain, to try to determine how solid such claims are. This would involve trying to figure out whether there is really any robust evidence for the claims that are so often made about brains, such as the claim that brains store memories, and claims that brains produce ideas and understanding. Such a study would be extremely involved, and would need to involve an in-depth examination of whether the typical research practices of modern neuroscientists are sound, or whether they are faulty.

Second, make a very thorough study of whether the brain actually has the type of physical characteristics that it would need to have if the claims typically made about brains are correct. Such a study would need to ask questions such as this:

- Does the brain actually have any mechanism for writing learned information?

- Does the brain actually have any mechanism for reading learned information?
- Does the brain actually have any characteristics allowing an instant retrieval of learned information?
- Does the brain have the type of stablity needed to store information for many decades, or does it have the kind of high molecular turnover that would prevent such a thing?
- Does the brain actually have the kind of speed it would need to be the cause of instant human recall and fast thinking?
- Has anyone ever found any sign of stored learned information in brains?
- Does anyone actually understand any system by which a brain could translate learned information or episodic memories into brain states?

Third, make a very thorough study of whether the brain actually appears like some organ that is storing memories or producing thoughts. Such a study would need to ask questions such as this:

- Do brains really look different or act different when people are engaging in actions such as thinking or recalling memories, or are the differences in its appearances at such time merely the kind of differences we would expect to see by chance variations?
- How much of their memories do people lose when you remove half their brain?
- Can people with only half a brain (or much less) still think well and understand well?
- Are some people able to think and remember well with much smaller than half a brain?

Fourth, make a very thorough study of claims of paranormal phenomena, which would involve studying very many long volumes discussing people who have reported such experiences. Such a study would need to ask questions such as this:

- Is there real evidence for ESP and clairvoyance, human mental abilities that cannot be explained by brain activity?
- Is there real evidence that human consciousness can exist outside of the brain (something which, if true, would in itself disprove claims that minds are made by brains)?
- Is there evidence for apparition sightings that cannot be credibly explained as hallucinations?
- Is there evidence from things such as near-death experiences and mediumistic phenomena that a soul can survive death?

After doing all of this work, you may gain some insight about whether conventional claims about the mind and body (claims that the mind is purely the product of the brain) are credible, or whether they are merely speech customs that are contrary to the evidence. But it seems that John Horgan's new book fails to do any of this work.

Horgan show no real signs of having made any serious and thorough study of cognitive neuroscience and whether its claims are warranted. Horgan has apparently made no serious study of evidence for paranormal phenomena. Horgan's approach is to merely have a set of main chapters, each of which deals with what one particular living person thinks on questions of mind and body, each a person who Horgan has chatted with. So Chapter One is devoted to describing what Cristof Koch thinks about mind-body questions; Chapter Two is devoted to describing what Douglas Hofstadter thinks about mind-body questions; Chapter Three is devoted to describing what Alison Gopnik thinks about mind-body questions; and so forth. Strangely, Chapter Five is devoted to describing what a Freudian lawyer thinks about mind-body questions; Chapter Seven is devoted to describing what a novelist thinks about mind-body questions; and Chapter Nine is devoted to describing what an economist thinks about mind-body problems. This is not at all an algorithm with much of a chance of shedding any interesting new light on questions about mind and body. Consequently Horgan's book is not worth reading. We get lots of "personality sketch" and "biographical background" material, but little evidence that Horgan has asked the questions he should have asked when writing on the topic of the body and mind. The quotes we get from the stars of Horgan's book rather seem to be all little sound bites rather than long illuminating paragraph quotes. It seems Horgan hasn't given the people he interviewed the type of tough questioning he should have given them, and he says, "When I'm interviewing someone, I have an extra incentive to be nice," and "I want subjects to like me," which may suggest he has been tossing softball questions to the people he has interviewed.

In Chapter Four, Horgan pretty much suggests that he has done nothing to seriously study evidence for the paranormal (so very relevant to questions of mind and body), and that his failure to do so is based on fear of such scholarship being a bad career move for him:

"After I became a professional science journalist, my interest in the paranormal, or psi, faded as I delved into more scientifically acceptable mysteries. I decided that ghosts, telepathy and telekinesis are woo. My skepticism is not strictly rational—that is, based entirely on objective, empirical analysis. Like, say, sexual faithfulness, skepticism has become a fundamental part of my identity, personal and professional. A choice. I'm proud of my skepticism, but a little ambivalent, too, because it is based in part on cowardice (again, like sexual faithfulness). I fear if I become too open-minded toward the paranormal, I might harm my image as a science writer, such as it is, and my self-image. I might forget who I really am."

We have every reason to believe after such a frank confession that Horgan has deliberately avoided studying the paranormal, not because of any sound intellectual reason, but because he fears that learning about such a topic might lead him to be disapproved by his peers. What he describes as his "skepticism" may better be described as an obstinate refusal to examine evidence that might shake prior opinions. Apparently such cowered-by-the-herd behavior is very common. Horgan quotes biologist Rupert Sheldrake as saying "that scientists constantly confess, privately, that they keep their belief in the paranormal secret for fear of damaging their reputations." It is unwise to suggest that by studying evidence for the paranormal, someone will "forget who he really is," and such an investigation may instead help you discover something about who you really are (something much more than the mere ephemeral apelike neural epiphenomenon depicted by many who haven't studied the paranormal).

Horgan fails to discuss in much of any substantive way any of the main problems that plague contemporary neuroscience, and says very little about the details of the brain. He incorrectly defines the mind-body question as "how matter generates mind" rather than some more appropriate definition such as "the problem of what is the relation between mind and body." He ends up with a kind of shoulder-shrugging chapter that seems to say or insinuate that we can't get much of anywhere understanding much of anything about mind-body questions. This is not at all correct. By very carefully and thoroughly studying a large set of things that Horgan has not paid attention to (such as anomalous medical cases, out-of-body experiences, the slowness, high noise levels, high protein turnover and many very serious physical limitations and functional shortfalls of all brains, the explanatory failures and defective procedures of neuroscientists, and the abundant evidence of paranormal mental phenomena that cannot be explained as brain activity), we can gain very solid reasons for reaching the extremely important mind-body realization that our minds must have some source other than our physical bodies.

at April 17, 2021 2 comments:

Thursday, April 8, 2021

Brain Bluffs at One Web Site

The web site "The Conversation" is a site that has a byline of "Academic rigor, journalistic flare." But looking through the site's articles on the topic of the brain, I found quite a few articles that were lacking in academic rigor.

One recent article was entitled "Your brain thinks -- but how?" The article provided zero evidence that brains are capable of any such thing as thinking. The author was given a question of "How does a brain understand things?" The author failed to give the only candid answer someone could give to such a question, which is something "No one understands how a brain could ever understand anything."

Instead, we have an answer that is purely psychological, without referencing any specific thing in the brain. There is no mention of neurons or synapses or connections. There is a reference to the psychology term "schemas," which is not a neuroscience term, but merely a term meaning something like a model or a concept of how something works. You don't explain understanding by using a word that presumes understanding. All in all, the article is compatible with the assumption that the modern biologist has no idea at all how a brain could produce thinking or understanding.

Another article on the site is entitled "How brains do what they do is more complex than what anatomy on its own suggests." The article is a strange inconsistent mixture of the usual brain-related dogmatic posturing along with some epistemic humility that is utterly inconsistent with such dogmatism. The author claims the brain's jobs include learning and reasoning, and he also states this groundless claim: "the frontal cortex of the brain makes optimal choices by computing many quantities, or variables – calculating the potential payoff, the probability of success and the cost in terms of time and effort." But the author also states this:

"How the brain works remains a puzzle with only a few pieces in place...no one seems much closer to figuring out how we really see. Neuroscience has only a rudimentary understanding of how it all fits together."

So with his left hand the writer is writing as if things are nicely figured out, and with his right hand he is writing as if nothing much is understood, not even how people see things.

Another article on the site has the very silly title "Brains manage neurons like air traffic controllers manage airplane movements." Besides the fact that there is no evidence that brains manage anything (merely evidence that minds manage things), there is the fact that neurons do not move around in the brain, in contrast to airplanes that do move very quickly. In this article we have this misleading statement: "It is important to note that neuron activity — a series of Morse code-like impulses — is not random." Neurons do indeed fire at random intervals, and if you do a Google search using the exact search phrase of "neurons fire randomly" enclosed in quotes, you will find many matches for that phrase. Also, no one has ever discovered anything like a Morse code used by neurons. The Morse code is a code in which particular combinations of dots and dashes stand for particular letters in the alphabet. No one has ever discovered any code in the brain, under which particular combinations of neuron firing and non-firing stand for particular letters, or stand for anything else.

Another article has the very untrue title "How memories are formed and retrieved by the brain revealed in a new study." The article is boasting about some study done by its authors. The study didn't reveal anything about how memories are formed or retrieved; it merely analyzed brain waves during memory formation and retrieval, looking for some correlations between activity in different brain regions. The study has the same old Questionable Research Practices predominant in cognitive neuroscience studies done these days. These include:

- The study was not a pre-registered study describing a particular hypothesis to test and a protocol to follow, meaning that the authors were free to keep analyzing data in innumerable different ways, slicing and dicing the data until some correlation was found.
- The study does not mention any blinding protocol, an absolute essential for a study of this type to be taken seriously.
- The study used study group sizes as small as 5 and 7, which are much smaller than the 15 subjects per study group needed for a modestly persuasive result.
- The study makes no mention of using control readings, in which subjects had their brain signals read when not engaging in any memory activity.

Studies like this should persuade no one. You can get a thousand-and-one false alarm effects using tiny study group sizes such as 5 and 7, effects that would be very unlikely to show up using decent study group sizes such as 20 or 40.

Each region of the brain is constantly active, from an electrical standpoint, with the average neuron firing between about one to several or many times per second, regardless of whether you are doing anything related to memory. So any neuroscientist can measure brain activity during memory action, and state that two brain regions are "working together" on the grounds that both are active during memory action. You would get the same amount of activity (the same "working together") if no memory activity was involved. If the experiments of this paper had been properly designed, with the use of controls in which brain signals were read when no memory activity was going on, the experimenters would probably have seen no greater activity (or correlation between brain areas) during memory activity than during mind activity when there was no memory action.

The study in question is based on dubious claims of "coupling" and "synchronization" between wave oscillations in different brain areas. The approach of this paper is similar to the type of silliness that would be going on if you simultaneoulsy tracked in real time the heart beats of ten women in the same room as you, and then claimed that there was some great significance in one of the heart pulses being "coupled" or "synchronized" with yours (ignoring the fact that you would expect one such case of "synchronization" purely by chance).

Then there is an article entitled "How the brain makes choices: the sinuous path from decision to action." The article gives us no explanation as to how a brain could do any such thing as make a decision or a choice. The article says, "how we deliberate and commit is a complex process that we only partially understand," but has no discussion of such alleged partial understanding. The very title of the article tells us that the article isn't really about "how the brain makes choices" but about something going on after a decision.

The there is a clickbait article with the title "Deciphering how memory works in the brain – at the level of individual cells." The article merely discusses a speculative model presented in a paper entitled "A neural-level model of spatial memory and imagery."

Then there is an article entitled "How your brain retrieves a memory when you sense something familiar." But it's another "how your brain does something" that does nothing to show how a brain could do something. All we get is a claim that some particular region of the brain is "involved" in memory processing. Such claims are made on the basis of mere readings of activity during memory action, but such readings mean nothing because all regions of the brain are constantly active. We get no insight of how it is that a brain could instantly recall facts about a person after seeing that person or merely hearing his name, a feat of retrieval that should be absolutely impossible given the brain's lack of any indexing system or addressing system that might allow very fast information retrieval.

Using an expression popular in Texas, you might say that the people who call themselves cognitive neuroscientists are pretty much "all hat and no cattle" when they try to provide evidence for their dogmas about cognitive abilities of brains. We know that minds think and believe and imagine and remember detailed information, but we do not know (or have any good basis for supposing) that brains do any such things.

at April 08, 2021 2 comments:

Saturday, March 27, 2021

Recent Study Finds No Correlation Between Number of Brain Cells and IQ

Our science news are hopelessly biased towards propagating prevailing beliefs about the mind and brain. It seems that whenever there are published scientific studies that seem to support prevailing dogmas about the brain, we will see many press stories talking about such studies, no matter how insufficient their sample sizes may or no matter how dubious their methodology may be, and even if the stories were only done with mice rather than humans. But if we have a study providing results conflicting with prevailing dogmas about the brain, it will usually not be covered by the science news sites even if the study had a good sample size and used humans. And so despite reading several science news websites every day, I read no mention in them of a recent study finding the important result that there is no correlation betwen the number of brain cells and intelligence.

The study published in the January 2021 volume of the journal Cerebral Cortex was entitled "Is There a Correlation Between the Number of Brain Cells and IQ?" The authors (Nicharatch Songthawornpong, Thomas W Teasdale, Mikkel V Olesen, and Bente Pakkenberg) examined 50 brains of Danish males who had died for reasons other than brain disease. It was possible to reliably estimate the IQ of these Danish males because they all had taken a military mental performance test that very highly correlates with IQ, and is essentially an intelligence test.

The paper very clearly states its results:

"In our sample of 50 male brains, IQ scores did not correlate significantly with the total number of neurons (Fig. 1A), oligodendrocytes (Fig. 1B), astrocytes (Fig. 1C) or microglia (Fig. 1D) in the neocortex, nor with the cortical volume (Fig. 2A), surface area (Fig. 2B) and thickness (Fig. 2C). This also applied to estimates of the four separate lobes (frontal-, temporal-, parietal-, and occipital cortices; see Supplementary Material). Neither did IQ score correlate significantly with the volumes of white matter (Fig. 2D), central gray matter (Fig. 2E) or lateral ventricles (Fig. 2F), nor with the

brain weight (Fig. 3A), or body height (Fig. 3B). All of these correlation coefficients were less than 0.2."

What this means is that the authors found:

- It is not at all true that the more brain cells you have, the more likely you are to be smart.
- It is not at all true that the more gray matter in your brain, the more likely you are to be smart.
- It is not at all true that the more white matter in your brain, the more likely you are to be smart.
- It is not all true that the heavier your brain, the more likely you are to be smart.

Although such results do not by themselves show that your brain is not the source of your mind, such results are quite compatible with the hypothesis that your brain is not the source of your mind. In Figure 1A of the paper, we see that 3 of the 7 or 8 subjects with the lowest number of neuron cells had above average intelligence. The correlation between the number of neuron cells and intelligence was actually a very slight *negative* correlation, although not statistically significant.

The results of this study should come as no surprise to anyone who has studied the posts on this site, such as my post here discussing how removal of half of the brain (to stop very epileptic seizures) has little effect on intellect or memory. The results of this study should also come as no surprise to anyone familiar two items mentioned by the study's authors: that "the rather large difference in neocortical neuron number between men and women (16% higher in men, Pakkenberg and Gundersen 1997) does not match with the minor gender difference in IQ (Halpern and LaMay 2000) and that highly demented female Alzheimer's disease patients have normal neocortical neuron numbers (Regeur et al. 1994, Pelvig et al. 2003)."

The 2019 study discussed here studied the brains of 324 people by brain scanning, and found no good evidence for any relation between brain parameters or knowledge and intelligence.

at March 27, 2021 No comments:

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Head Truth

The huge case for thinking minds do not come from brains

Friday, March 19, 2021

Why a "Mechanical Memory" Theory Does Not Work

Neuroscientists rarely advance detailed explicit theories claiming that brains store memories in some very specific way. They are usually content to speak vaguely about such a topic, as they do when they claim not very specifically that memories may be stored through "synapse strengthening" without stating some specific idea about how memory storage could work in such a way. I know why neuroscientists are so vague on this topic. It is because any attempt to postulate a detailed specific theory of memory storage in brains will have all kinds of glaring defects and credibility shortfalls (just as there would be glaring defects and credibility shortfalls in any specific detailed theory attempting to explain how Santa Claus could deliver toys to all the world's good children on Christmas Day or Christmas Eve).

But very rarely an attempt will be made to advance a detailed explicit theory about brain memory storage. Let us look at one such recent attempt, and how it falls flat on its face. The theory was advanced by Benjamin T. Goult of the University of Kent, in a paper entitled, "The Mechanical Basis of Memory – the MeshCODE Theory."

Goult advances the theory that human memory information is stored in binary format. Binary is when information is stored as merely a sequence of ones and zeroes, such as 10110010101010110010101101111001. There are quite a few severe problems with such an idea, including the following:

Problem #1: Human experience and learning does not occur in binary format. When we see things or hear things or feel things, there is not passing through our bodies anything like a stream of binary numbers such as 11001010101010100010101. Auditory and visual perceptions occur in an analog form that is entirely different from the digital form of binary information.

Problem #2: **Whenever human experience or learning is capable of being translated into binary format, it requires translation schemes and encoding protocols that are not known to exist anywhere in the brain or body.** Some things that humans learn or experience are capable of being translated into binary by means of translation schemes and encoding schemes. But such schemes are complicated. For example, visual information seen with the eye or a camera can be translated into binary through an RGB method in which each pixel is represented by three different numbers between 1 and 256: one number representing the red intensity, another number representing the green intensity, and another number representing the blue intensity. Then those three decimal numbers can be translated into binary format. But such a technique for converting analog visual information into digital binary information involves translation schemes and encoding schemes that are not

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known to be available anywhere in the brain or body. Similarly, strings of text such as "my dog has fleas" can be translated into binary by a computer system that (a) has knowledge of the English alphabet; (b) has a table like the ASCII table that translates English letters into decimal numbers; (c) has a subroutine for converting such decimal numbers into binary. But no such things are known to exist in the human brain. Human minds are familiar with the English alphabet, but on the neuron level and synapse level we have no evidence of any familiarity with such an alphabet. There is no reason why the brain's biochemistry would have some encoding scheme based on something like the English alphabet, which has existed for less than 3000 years. Converting analog data such as sounds into binary requires two different conversions (from analog into decimal, and from decimal into binary). There is zero evidence that the human body has ever internally done either one of these types of conversions.

Problem #3: **Much of human experience could never be translated into binary format.** Humans remember emotions, and there is no way to translate such emotions into binary format. Humans also remember things like pleasures, pains, tastes and smells, and there is no way to translate such things into binary format. Humans also remember learned physical skills, such as how to ride a bike, how to swim, how to dance and how to play a musical instrument. Such skills cannot be translated into binary format.

Problem #4: **The human body is not known to have anything like any capability for writing learned information in binary format.** Scientists have not discovered any capability for writing learned information in any form to any part of the brain.

Problem #5: The human body is not known to have anything like any capability for reading information in binary format. Scientists have not discovered any capability for reading information in any form from the brain, with the exception of the DNA-reading capability found in brain cells and all other cells, which is not memory information.

Goult's paper does nothing to address the first three of these problems. He does make a very clumsy attempt to address Problem #4, by speculating about how something known to exist in the brain might function as a system for storing binary information. He mentions a protein called Talin, and (as we see in Figure 2 of his paper) he speculates that perhaps when some section of such a protein is folded, that stands for "0" and when the same section of such a protein is not folded, that stands for "1."

This wildly imaginative speculation is about as silly as claiming that clouds might store binary information, because round clouds might stand for "0" and oval-shaped clouds might stand for "1." Such clouds would not meet the essential characteristic of a binary storage system, that there be only two possible states. Since there would be 100 gradations between "round" and "oval" shapes, you could never store binary information in clouds. Similarly, sections of a protein molecule would have 100 or more possible states of folding. So it would never work to try to store binary information by using the shapes of particular sections of a protein molecule to stand for either 0 or 1. And if information were stored in such a way, there would be no way to read it as binary, as the body has no such thing as some mechanism for analyzing the shapes of sections of protein molecules.

Contrary to Goult's speculations, protein molecules are totally unsuitable for storing binary sequences.

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- Five Hallmarks of an Information Storage System (None of Which Your Synapses Have)
- Your Physical Structure Did Not Arise Bottom-Up, So Why Think Your Mind Did?
- Why a "Mechanical Memory" Theory Does Not Work
- The Brain Seems to Have No Mechanism for Reading or Writing Memories
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- Prevailing Brain Dogmas Cannot Explain Hypnotic Phenomena
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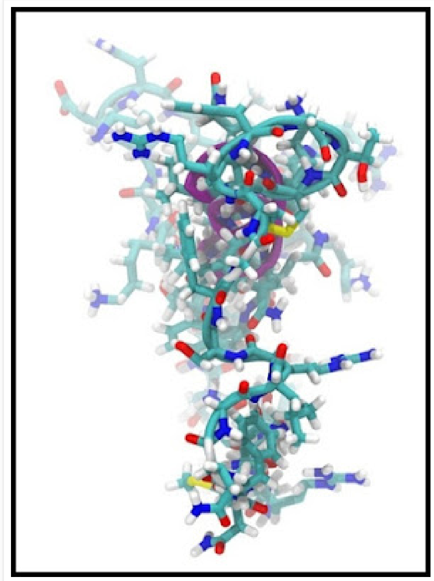

No binary storage capability in something like this

Let's imagine some protein molecule in which particular sections of the molecule would always toggle between two states (contrary to the evidence that no such two-state toggle could exist, and that such sections could have innumerable different shapes). Then how much binary information could be stored in such a protein molecule? No more than a few bits.

But what if you wanted to store a decent chunk of information, such as, say, the famous line, "Four score and seven years ago our fathers brought forth, upon this continent, a new nation, conceived in liberty, and dedicated to the proposition that all men are created equal"? That requires the following binary sequence:

01000110 01101111 01110101 01110010 00100000 01110011 01100011 01101111 01110010 01100101 00100000 01100001 01101110 01100100 00100000 01110011 01100101 01110110 01100101 01101110 00100000 01111001 01100101 01100001 01110010 01110011 00100000 01100001 01100111 01101111 00100000 01101111 01110101 01110010 00100000 01100110 01100001 01110100 01101000 01100101 01110010 01110011 00100000 01100010 01110010 01101111 01110101 01100111 01101000 01110100 00100000 01100110 01101111 01110010 01110100 01101000 00101100 00100000 01110101 01110000 01101111 01101110 00100000 01110100 01101000 01101001 01110011 00100000 01100011 01101111 01101110 01110100 01101001 01101110 01100101 01101110 01110100 00101100 00100000 01100001 00100000 01101110 01100101 01110111 00100000 01101110 01100001 01110100 01101001 01101111 01101110 00101100 00100000 01100011 01101111 01101110 01100011 01100101 01101001 01110110 01100101 01100100 00100000 01101001 01101110 00100000 01101100 01101001 01100010 01100101 01110010 01110100 01111001 00101100 00100000 01100001 01101110 01100100 00100000 01100100 01100101 01100100 01101001 01100011 01100001 01110100 01100101 01100100 00100000 01110100 01101111 00100000 01110100 01101000 01100101 00100000 01110000 01110010 01101111 01110000 01101111 01110011 01101001 01110100 01101001 01101111 01101110 00100000 01110100 01101000 01100001 01110100 00100000 01100001 01101100 01101100 00100000 01101101 01100101 01101110 00100000 01100001 01110010 01100101 00100000 01100011 01110010 01100101

- Exhibit A Suggesting Scientists Don't Understand How a Brain Could Store a Memory
- The Dubious Dogma That Brains Make Decisions
- Long Article Tries to Show Neural Memory Storage, but Gives No Real Evidence for It
- How Evidence for ESP Undermines the "Minds Come From Brains" Dogma
- Gender Differences in Brains Help Discredit Prevailing Dogmas About Brains
- Study Finds Equal Brain Connectivity in All Mammals
- Some Reasons the Main Theory of Neural Memory Storage Is Unbelievable
- Scientists Can't Persuasively Explain How a Brain Could Instantly Retrieve a Memory
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- Fraud and Misconduct Are Not Very Rare in Biology
- Reasons for Doubting Thought Comes from the Frontal Lobes or Prefrontal Cortex
- Why Most Animal Memory Experiments Tell Us Nothing About Human Memory
- Other Evidence of Human Paranormal Abilities

01100001 01110100 01100101 01100100 00100000 01100101 01110001 01110101 01100001 01101100 00101110

But there would be no way to store that in a Talin molecule under Goult's speculation. Under his speculation, each Talin molecule could store no more than about 13 of these digits. So storing a binary sequence like the one above would require many Talin molecules. But Talin molecules do not exist in any linear sequence in the brain. Instead they are scattered in three dimensional space. There would be no way to trace any sequence such as the one above in the brain. There would be innumerable routes between the different Talin molecules scattered throughout three-dimensional space, not a single linear route. Similarly, if I pour a jumbo box of Alpha Bits cereal (each piece of which is a letter) into a bucket of thick mud, and shake the thick mud, then the Alpha Bits letters would be scattered in a three dimensional way, and there would be no way to recognize a particular path from one letter to the next letter. The resulting mess could always be read in a million different ways, depending on how the path was traced in three-dimensional space.

A DNA molecule is a one-dimensional thing. It has a very clear beginning and end, and once you are at one point in the sequence, there is always a very clear "next token" and a very clear "previous token." A DNA molecule is a physical structure that allows linear reading. Talin molecules scattered in different positions in three-dimensional space (among very many other protein molecules) could never be a system allowing information to be read in any kind of regular, linear way.

Were binary information to be stored according to Goult's speculation, there would be no way to read it. Reading such information would require some shape recognizer or fold shape recognizer that could traverse Talin molecules to analyze what shapes particular sections had. No such thing exists.

What Goult has imagined is that protein folding could be used to store binary information. Protein folding is a mysterious thing, and we don't know how it happens. It is known that protein folding is relatively slow. For a new protein molecule to assume its characteristic three-dimensional shape requires between 50 seconds and 3000 seconds. Such a process is way, way to slow to be an explanation for human memory acquisition, which can occur instantly.

Then there is the question of protein molecule lifetimes, which Goult ignores. Protein molecules in synapses have only short lifetimes averaging less than two weeks. According to the paper here, the half-life of the Talin molecule is only about 18 hours. Synapse proteins such as Talin therefore have lifetimes 1000 times too short to explain human memories, which can survive for 50 years of more. This factor alone is a decisive reason for rejecting Goult's theory altogether, along with every other claim that long-term memories are stored in synapses.

Trying to lessen the probem of instant memory retrieval, Goult mentions several times the idea of indexes in the brain, which would make retrieval faster. He fails to tell us the reality here, that there is zero evidence for any kind of indexing in the brain. In fact, we know of the strongest reason why indexing should be impossible in the brain. It is that the brain is absolutely lacking in any type of coordinate system or position notation system or addressing system.

Think of how an index works in a book. The index has lines that link topics with page numbers that represent exact locations in the book. But the brain is

- Why Brains Are Not Suitable for Storing Long Sequences Like Humans Remember
- Why Brain Scans Don't Show Brains Make Minds
- Why Strokes, Alzheimer's Disease and Drunkenness Don't Prove the “Brains Make Minds” Dogma
- Synaptic Density Studies Contradict the Most Popular Memory Theory
- The Rare "Total Recall" Effect That Conflicts with Brain Dogmas
- Physical Connections Do Nothing to Explain Cognition
- The Sociological Reasons Why Bad Explanations Persist in Academia
- Split-Brain Cases Conflict with "Brains Make Minds" Dogma
- Why So Much of Neuroscience News Is Unreliable
- An Analogy Clarifying Why the "Brain Stores All Your Memories" Dogma Is Untenable
- Why Darwinism Fails to Explain the Human Mind
- What Is It That a Brain Does?
- Cloud Computing and a Non-Local Model of Consciousness
- Why We Do Not Understand the Origin of Complex Biological Innovations
- Our Minds May Arrive Top-Down Not Bottom-Up
- Fancy New Technology Fails to Prove Memory Dogmas
- The Argument for Determinism Collapses Once We Discard the "Minds Come from Brains" Dogma
- Animal Experiments Conflicting with the Dogma That the Brain Stores All Memories
- Memory Recall Reality Versus the "We Can't Remember Well" Bunk of Professors
- Neuroscientists Keep Using Misleading Coloring in Brain Visuals
- Most Scientists Don't Follow Formal Evidence Standards, Unlike Judges
- Experimental Evidence for ESP Is Well-Replicated
- Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades
- NIH Bets $1,434,188 That Synapses Don't Store Memories
- A New Case of Very Large Brain Damage and Normal Mental Function
- When Clue-Blind Professors Ignore All the Signs

like a city in which none of the streets have names, and none of the houses have house numbers (or a book in which none of the pages are numbered). Lacking any such addressing system, there is no way in which a brain could ever have an indexing system. That's one of many reasons why instant memory retrieval cannot be reading information stored in brains. Finding a memory stored in a brain would be as slow as finding an index card in a swimming pool that was a disorganized heap of index cards.

Goult tells us, "Synapses are the perfect system for optimised cell signalling between connected cells, and there are approximately 100 trillion synapses in the brain." The claim that synapses are "the perfect system for optimised cell signalling between connected cells" is pretty much the opposite of the truth. To the contrary, it is well known that synapses transmit signals with low reliability. A particular signal will have a probability of less than .5 (and as low as .1) of transmitting successfully across a chemical synapse; and a brain signal would need to cross countless such unreliable synapses to move a tiny distance in the brain. One expert tells us that a signal passing through a synapse "makes it across the synapse with a probability like one half, or even less." This is a very major reason for thinking that when humans recall with 100% accuracy large bodies of information (as people do such as stage actors who play Hamlet), they cannot possibly be retrieving information stored in or around synapses, as Goult imagines. An analogous situation is some person in a very noisy cafeteria, giving a message to the person next to him (who has only a 50% chance of hearing the message right), and then saying, "Keep the message passing on." If the message has to pass through 100 people in the cafeteria, from one to another, with each one having only a 50% chance of passing the message on accurately, we have pretty much the perfect recipe for unreliable signalling.

A second reason why synapses are quite the opposite of being "the perfect system for optimised cell signalling between connected cells" is that chemical synapses are a very serious signal slowing factor. Each jump across the gap of a synaptic junction causes what is called a synaptic delay, of between .5 milliseconds and sometimes as much as 2 to 4 milliseconds. The problem is that a huge number of these synaptic junctions must be traversed each time a brain signal crosses every centimeter. The cumulative effect of such synaptic delays should make brains way too slow to account for instant human recall and very fast human calculation speed by many savants. The problem is discussed in great detail in this post.

There is no observational evidence to substantiate Goult's theory. No one has detected any binary information stored in any Talin molecule in the brain. No one has detected any binary information stored anywhere in the human body. There is genetic information in DNA molecules, but that information is not binary information.

We know what binary information would look like if it were stored in the body. There would be a very long continuous sequence of physical items that could have only two possible states. It would be an arrangement nothing at all like what Goult has imagined. An example might be a long molecule with only two elements, existing in a long string-like sequence. For example, the molecule might have a composition with a very long sequence like this:
COOOCCCOCOOOCCCCOCOOCCOCCOCOCOCCOCOCOCOCOCCOC
OCOCCOCOCOCOC.

Under such a system, the C's (carbon atoms) might stand for 1, and the O's (oxygen atoms) might stand for 0. We see no such sequences in any molecules

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- He's Strangely Seeking Memories in Cells Below the Neck
- Just Call Them "Machine-Metaphor-Misguided"
- Way Off in Their Predictions, Neuroscientists Keep Misdescribing Human Memory Performance
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- Suspect Shenanigans When You Hear Claims of "Mind Reading" Technology
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- EEG Studies Fail to Provide Robust Evidence That Brains Think or Retrieve Memories
- Seven Things in Fast Retrieval Systems, None of Which Your Brain Has
- Studies Debunk Hippocampus Memory Myths
- 11 Authorities Seem to Realize That "Your Brain Is a Computer" Is a Junk Metaphor

in the body. Carbohydrates are combinations of three types of atoms (carbon, oxygen and hydrogen), not two. Protein molecules are made from twenty different amino acids, and each such amino acid is built from at least four different atoms (nitrogen, hydrogen, oxygen and carbon). Goult speculating about binary information stored in protein molecules is like someone speculating that clouds store advertising messages. Just as clouds bear no resemblance to a system for storing advertising messages, protein molecules bear no resemblance to a system for storing binary information.

Some of the things I have mentioned here are "show stoppers" not merely for Goult's scheme but also for any and all attempts to imagine the brain permanately storing information in binary format or any other material format.

I have argued at length in various posts on this blog (such as this one) that the concept of an engram (an alleged place in the brain where a memory is stored) has no robust observational basis. It is interesting that Goult's paper is part of a group of five papers by different authors, and one of those papers suggests abandoning the use of the term "engram," replacing it with "more neutral" terms such as *cell assembly (supporting memory).* Besides discussing numerous ways in which current neuroscientists are using language in dubious and objectionable ways, the authors (Hardt and Sossin) state, "Stated succinctly, the term engram may reflect more wishful thinking than how memory and brain actually relate."

at March 19, 2021 2 comments:

Labels: binary memory storage theory, memory recall, memory storage

Thursday, March 11, 2021

When Clue-Blind Professors Ignore All the Signs

The 1999 film "The Sixth Sense" is widely considered the best film of the director M. Night Shyamalan, who wrote the script. If you have not seen this film, I suggest streaming it or catching it on youtube.com or pay TV before reading the rest of this post, which has spoilers concerning its ending.

At the end of the film there is a plot twist that isn't really a plot twist because you should have been able to anticipate it, although most people fail to do so. The story goes like this:

First, we see a child psychologist character named Crowe (played by Bruce Willis) being shot in the chest at point-blank range by someone intruding into his home. Then we see Crowe meeting a boy who confesses that he sees ghosts walking around, who are unaware they have died. There are various spooky occurrences, and at the end comes the big plot twist. It turns out that Crowe, who most viewers of the movie thought was a regular physical person, is actually a ghost, one of the deceased people that the boy can see. Only at the end of the movie does Crowe realize that he was killed in the gun attack at the beginning of the movie.

Members of the original audience of the movie must have kind of slapped their foreheads upon seeing the movie's ending, saying to themselves, "I'm such an idiot -- why didn't I figure that out all along?" There were actually two very clear reasons for suspecting that Crowe (the Bruce Willis character) was a ghost throughout his interactions with the boy. They were:

(1) We see the character Crowe shot at point blank range at the beginning of the movie.

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- They're Calling It a Huge Memory Research Fraud, But Is It Only the Tip of the Iceberg?
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- Shrink-Speaking About a Mere "Problem of Consciousness" Is As Wrong As Shrink-Speaking About a Mere "Problem of Human Shape Origination"
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- Some of the Weak Papers Neuroscientists Cite As Evidence for Their Chief Claims
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- TV Medical Dramas Give Us Wrong Ideas About Minds and Death
- Brain Imaging Shows No Appreciable Neural Correlates of Memory Activity
- The Evidence Inversion Syndrome Blights Academia
- Poorly Designed Brain Scan Experiments Needlessly Put the Needy at Risk
- Science Literature Is Full of Misleading Claims About Brain Waves
- The US Government's False Claims About DNA
- If Neuroscientists Acted Like Cosmologists, They Might Say You Have an Invisible "Dark Brain"
- Exceptionally Fast Thinking Cannot Be Explained by Slow Brains Like We All Have
- Scientists and Clergy Have Much in Common
- 30 Things That Would Never Occur If Prevailing Neuroscientist Dogmas

(2) After he was shot, we never see Crowe having a back-and-forth two-way conversation with anyone other than the boy who sees ghosts who do not know they are dead. We see Crowe talking to his wife, but she is just staring into space, as if she could not even see or hear him.

In retrospect, it was easy to figure out the plot twist at the end, that all through the movie the boy was talking to the ghost of Crowe. But the audiences who first saw the movie were clue-blind, and very surprised by the ending. There is today a large group of people who seem even more clue-blind. This group is the group of materialist professors who deny the existence of a human soul, and claim that all mental phenomena come from the brain, and that the brain is the storage place of memories.

Let us consider some of the clues that reality has given us about the relation of the body and the mind.

- Scientists discovered the genetic information in all cells around 1950, but it is now the year 2021, and no has ever discovered any stored memory information in a brain of a human being, even through brain tissue has been examined at resolutions vastly greater than the resolutions sufficient to discover DNA in cells.
- Many humans (both children and adults) have had half of their brains removed to stop very bad and frequent epileptic seizures, but when surgery is done, it has little effect on intelligence or memory, with learned knowledge being well preserved.
- Many humans can remember very well things they learned or experienced 50 years ago, but the average lifetime of the proteins in synapses (claimed to be the storage place of memories) is 1000 times shorter than 50 years (less than two weeks).
- Humans are able to form new memories instantly, in contradiction to all theories of brain memory storage, which typically postulate "synapse strengthening" that would take minutes.
- Even though the brain has no physical characteristics that would allow any such thing as instant memory retrieval (something like an indexing system or a position notation system or coordinate system that might allow stored information to be quickly found), humans are able to retrieve learned information instantly upon hearing some person name or event name or place name, even if they haven't heard such a name in many years.
- Very many humans (as many as 10 percent or 20 percent of the population) report floating out of their bodies, and observing their bodies from above them in space.
- Inside brains there is very severe noise of several different types that should prevent humans from being able to reliably recall large bodies of information, but it is a fact that many people (such as actors playing the role of Hamlet) can recall very large bodies of textual information with perfect accuracy.
- There are hundreds of documented cases of people who saw an apparition of someone who died, but who they did not know was dead, only to soon learn that the person had died about the time when the apparition was seen.
- There are also very many cases of apparitions seen by more than one person at the same time, something we should expect to never or virtually happen if a mere brain hallucination was causing the sighting of the apparition.

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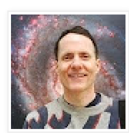

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- Instead of having some vastly greater brain connectivity that might help explain the superiority of the human mind, a study found that brain connectivity is about the same in all mammals; so we have the brain connectivity of mice.
- As discussed here, here, here, here, here, here, here and here, there is two hundred years of written evidence (often written by very weighty figures such as scientists and doctors) for the reality of clairvoyance, an ability that is not explicable under any theory that minds are created by brains.
- Quite a few people who have lost half of their brains due to disease or epilepsy surgery have average or above average intelligence; and the physician John Lorber showed that some people have above-average intelligence despite having the great majority of their brain tissue destroyed by disease.
- Besides a wealth of narrative evidence that some humans can have ESP (an ability inexplicable as a brain effect), there is abundant robust laboratory experimental evidence for ESP (discussed here, here and here).
- No one has any credible detailed theory of how a brain could ever store learned information (such as academic information) or episodic memories as neuron states or synapse states; and if such a thing were happening, it would require a whole host of very specialized memory-encoding proteins, which have never been discovered (along with some not-yet-discovered encoding scheme millions of times more complicated than the genetic code discovered around 1950).
- Brains show no signs of working harder during heavy thinking or memory recall, and brain scan attempts to find signs of such greater activity merely report variations such as half of one per cent, the kind of variations we would expect to get by chance, even if brains don't produce thinking or recall.
- Because of numerous severe slowing factors such as the cumulative slowing effect of synaptic delays and dendrites, signal transmission in the brain should be way too slow to account for the blazing fast thinking speed of some people able to do mathematical calculations at incredible speeds, and also the instant memory recall humans routinely show.
- People with dramatically higher recall of episodic memories or learned information seem to have no larger brains or brain superiority that could explain this.
- Contrary to the dogma that brains produce minds, ravens with tiny brains can do as well on quite a few mental tasks as apes with large brains; and also tiny mouse lemurs do just as well on quite a few cognitive tests as mammals with brains 200 times larger.
- As discussed here and here, scientists have very well documented inexplicable physical effects occurring around some people, suggesting they either have powers that cannot be explained in terms of brains and bodies, or are somehow in contact with others who have such powers.
- There are numerous reasons for suspecting some source of a human soul or spirit outside of the human body, including the sudden unexplained origin of the universe with just the right expansion rate to allow eventual planet formation, the very precise fine-tuning of fundamental physical constants and laws of nature

needed for biological habitability, the origin of life so hard to explain as a chemical event, the extremely hierarchical organization of biological organisms, the great abundance of complex fine-tuned protein molecules in organisms (each seeming to involve a vast mathematical improbability), the great abundance of immensely organized biological forms that are not explained by genomes that merely specify low-level chemical information, and abundant photographic evidence for paranormal effects that seem to suggest some unfathomable intelligence beyond any human understanding (see here and here for examples).
- People (sometimes called autistic savants) with very serious brain defects sometimes have astonishing powers of memory almost no one else has.
- Dying people commonly report seeing apparitions of the dead (usually their relatives), as reported here, here, and here; people having near-death experiences very frequently report encountering their deceased relatives; and widows and widowers frequently report voices or apparitions corresponding to their deceased spouses -- all just exactly as we would expect if we have souls that survive death.
- Many decades ago Leonora Piper was studied at great length for many years by scientists and scholars, and for many years she reported information about deceased people that should have been unknown to her.
- Human beings have many subtle and refined mental abilities (such as philosophical imagination, artistic creativity, musical ability, and subtle spirituality) that are inexplicable as results of brain evolution, such things having no value in increasing survival or reproduction.

All these clues tell us in a very loud voice that we are souls rather than being mere products of brains, souls that can sometimes display (either through their own ability or through interaction with other souls) powers far beyond any neural explanation. Such clues give us every reason for thinking that our memories are not stored in our brains, and that our memories and minds and identities will survive physical death, because they never were products of our brains. But our materialist professors continue to ignore every one of these clues, and believe the groundless idea that our minds are merely the products of brains that store our memories.

We should not call such professors "clueless," because that might suggest they have not been given clues. A much better term to use is "clue-blind." Should we say that our materialist professors are as clue-blind as the original audience of "The Sixth Sense"? That would not be a very apt comparison, because such an audience had only two clues to which they were blind. But our materialist professors are blind to so many different very obvious clues.

To get a better analogy for how enormously clue-blind our materialist professors act, let us imagine another movie, one we may call "The Boy Who Saw Ghosts." The plot might go like this:

- At the beginning of the movie, a psychologist named R.J. Chenson might get shot by an intruder, not merely in the chest, but shot right through the center of the forehead two times.
- We might then see an ambulance arriving, and the wife saying, "I think he's dead -- there's been no pulse for five minutes, and the

September 2018 (1)
August 2018 (1)
July 2018 (1)
June 2018 (1)
April 2018 (30)

Labels

- "brain as computer" metaphor
- academia dysfunction
- adult neurogenesis
- AI
- binary memory storage theory
- brain changes with age
- brain connectivity
- brain effect on personality
- brain imaging
- brain injury
- brain research projects
- brain shortfalls
- brain signal speed
- brain surgery
- brain uploading
- brain waves
- claims of mind reading by brain scans
- claims of neural correlates of mental activity
- COVID-19
- decisions
- default mode network
- dendritic spines
- depression
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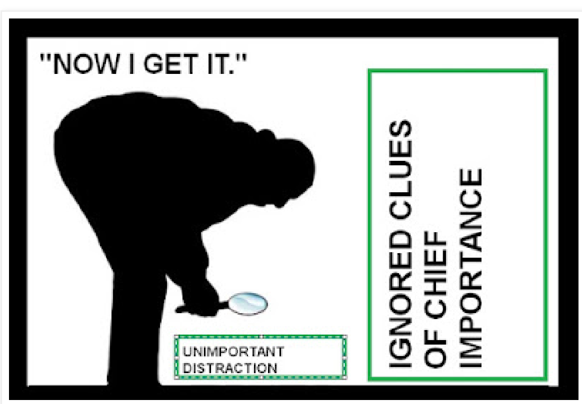
- DNA
- EEG studies
- emergence
- epilepsy
- ESP
- evolution
- exceptional memory
- exceptional speed of thinking
- file drawer effect
- fraud
- free will
- genes
- global workspace theory
- groupthink
- health hazards in neuroscience experiments
- hemispherectomy
- high mental function despite large brain damage

whole bed is very wet with blood."

- We might then see a visual of Chenson's mother weeping while looking at a picture of her son.
- We might then see someone buying a tombstone engraved "R.J. Chenson."
- We might then see a newspaper headline saying, "Friends Say Chenson Was a Great Guy."
- Instead of knocking on the door to see the boy who sees ghosts, Chenson might simply walk through a locked door to see him.
- Chenson might always leave a room by simply walking through a solid wall.
- Instead of looking like a regular person, Chenson might always look transparent as he interacts with the boy.
- Whenever Chenson talks with the boy indoors, we might see the boy's breath, as if it was almost freezing (it is reputed that ghosts can cause temperature drops).

Now imagine an audience were to watch this movie, and suppose the audience was to ignore all of these hard-to-ignore clues, and still keep thinking that Chenson was a regular physical human as he talked to the boy throughout the movie, believing that idea until the end of the movie when it was revealed that Chenson was killed by the intruder's gunfire. How clue-blind would such an audience be? Such an audience would be like materialist professors who continue to maintain that we are merely accidental soulless products of activity in a brain that stores our memories, despite so many powerful clues telling us that exactly the opposite is true, that we are souls hanging around in bodies that are not essential for our minds or our memories, and residents of a purposeful cosmos.

Another analogy for our clue-blind materialist professors is the analogy of someone who intends to drive from St. Louis to New York, and drives halfway from St. Louis to Los Angeles, constantly ignoring the setting sun ahead of him which tells him he is traveling west rather than east, and constantly ignoring the road signs telling him he is driving west rather than east.



at March 11, 2021 No comments:

Tuesday, March 2, 2021

They're Desperately Seeking Non-noise From the Brain's Dominant Noise

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

Brains are extremely noisy. Many neurons fire at unpredictable intervals, just as maple leaves fall from a tree in autumn at unpredictable intervals. A scientific paper tells us, “Neuronal variability (both in and across trials) can exhibit statistical characteristics (such as the mean and variance) that match those of random processes.” Another scientific paper tells us that “Neural activity in the mammalian brain is notoriously variable/noisy over time.” Another paper tells us, "We have confirmed that synaptic transmission at excitatory synapses is generally quite unreliable, with failure rates usually in excess of 0.5 [50%]." A paper tells us that there are two problems in synaptic transmission: (1) the low likelihood of a signal transmitting across a synapse, and (2) a randomness in the strength of the signal that is transmitted if such a signal transmission occurs. As the paper puts it (using more technical language than I just used):

"The probability of vesicle release is known to be generally low (0.1 to 0.4) from in vitro studies in some vertebrate and invertebrate systems (Stevens, 1994). This unreliability is further compounded by the trial-to-trial variability in the amplitude of the post-synaptic response to a vesicular release."

The 2010 paper "The low synaptic release probability in vivo" by Borst is devoted to the topic of what is the chance that a synapse will transmit a signal that it receives. It tells us, "A precise estimate of the *in vivo* release probability is difficult," but that "it can be expected to be closer to 0.1 than to the previous estimates of around 0.5." Slide number 20 of the 2019 Power Point presentation here has a graph showing that this release probability is often around 0.1 or 0.2, and the same page mentions 0.3 as a typical release probability.

Another paper concurs by also saying that there are two problems (unreliable synaptic transmission and a randomness in the signal strength when the transmission occurs):

"On average most synapses respond to only less than half of the presynaptic spikes, and if they respond, the amplitude of the postsynaptic current varies. This high degree of unreliability has been puzzling as it impairs information transmission."

All of these facts are extremely damaging to all claims that the brain is the storage place of human memories, and the source of human thought. We know that humans can recall large bodies of information with perfect reliability. This happens every time someone plays the role of Hamlet, and correctly speaks every word in the 1480 lines in this role. The same reliability occurs when numerous Muslim scholars correctly recall every word in their holy book, a book of more than 6000 verses. Akira Haraguchi was able to recite correctly from memory 100,000 digits of pi in 16 hours, in a filmed public exhibition. Besides such feats of perfectly reliable retrieval of very large bodies of information, there are also numerous math calculation savants who can perform very complex calculations with perfect accuracy. No such feats should be possible if they are produced by brains dominated by noise, brains in which signals are transmitted so unreliably.

So what do you do if you are a scientist or philosopher handling the topic of brain noise, but mind-chained to the dogma that everything mental comes from the brain? You desperately seek to evade the clear message spoken by the brain's physical characteristics (the message that brains are physically

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

unsuitable for massive accurate memory recall and accurate complex calculation), and you try to suggest that maybe there's non-noise in all of that tons and tons of brain noise. A pair of recent essays have been examples of such a thing.

An article in Quanta magazine is entitled "Brain's 'Background Noise' May Hold Clues to Persistent Mysteries." We see two of the tricks often used when discussing quarter-baked ideas without any real observational basis. The first trick is to use some very vague and not-very-confident phrase such as "could hold clues" when discussing some unsubstantiated idea. The second trick is to use the vague claim that a "growing number" of scientists think something or suspect something, which doesn't really mean anything substantial, since the "growing number" might be something like "2 out of 20,000 increasing to 3 out of 20,000." Whenever people make a claim of a "growing number" of scientists believing something, they never give actual statistics backing up such a claim, and so we should suspect that there's no actual basis for such a claim of growing popularity. The two tricks were used in this sentence: "Lendner is one of a growing number of neuroscientists energized by the idea that noise in the brain's electrical activity could hold new clues to its inner workings."

What follows in the article seems to be just an example of why people say "torture the data sufficiently and it will confess to anything," although in this case we don't even have such a "confession." We have a discussion of some scientists trying mathematical transformations of brain noise, eagerly trying to extract something that can be called a meaningful signal. No evidence is provided that the brain noise being analyzed is anything other than noise. We merely get the impression of scientists desperately seeking some signal where there is none. A similar thing might happen if biologists were to mathematically analyze dog barks in a hundred different ways, eagerly looking for some evidence of a dog language in the barks.

We are given not one bit of indication that the so-called "aperiodic signals" derived from these mathematical fiddlings with brain noise readings actually are any such thing as a signal containing information, like a radio signal. Near the end of the article, these alleged "aperiodic signals" extracted from brain noise by mathematical fiddlings are compared to dark matter, a comparison that may cause a chuckle in anyone who has critically studied modern cosmology. Dark matter has never even been observed.

At the Salon web site, we have an article by philosopher Thomas Nail entitled "Most brain activity is 'background noise' — and that's upending our understanding of consciousness." From this title you might get the idea that Nail has drawn the correct conclusion he should have drawn from "most brain activity is background noise": that the brain cannot be the cause of perfect recollections of vast bodies of information, and cannot be the cause of human mathematical calculation that can occur so flawlessly in some gifted people. But no, Nail has instead drawn the wrong conclusions. He makes groundless and silly-sounding statements such as "Neurons *amplify* the noise and even use it to help generate novel solutions to complex problems." No one has any understanding of how neurons could generate any ideas at all, and if neurons were to do such a thing, signal noise would be something to be avoided, not amplified.

Nail makes this incorrect claim: "Several critical studies in this area have shown that cognitive flux, or 'spontaneous fluctuation,' is not secondary to but rather *fundamental* for consciousness, as neuroscientists Georg Northoff, Robin Carhart-Harris, and Stanislas Dehaene argue." He provides links to these authors, but none of the links provides any evidence we can freely read backing up any claim that any such thing has been shown. Two of the links are to two old books unavailable for reading without purchase. Another link is to a paywalled paper with an abstract that confesses it is merely a hypothesis (one appealing rather suspiciously to psychedelic experiences as supporting evidence).

Nail provides no evidence for his groundless claim that "just as whirling patterns emerge from turbulent waters, our stream of conscious thoughts and feelings arise from the torrent of spontaneous brain fluctuations." This is a very absurd analogy. Whirling patterns in water do not involve information retrieval, and are momentary things showing no great organization. But a college professor can expound for a solid hour of organized thought on some topic, showing a degree of organization a thousand times greater than anything in whirling patterns of turbulent waters, and with an abundance of information retrieval not found in whirling patterns of turbulent waters. The spontaneous fluctuations constantly occuring in neurons (and other abundant sources of neural noise) should prevent any such organized thinking (with very accurate recall) from occurring, if our thinking were to be coming from our brains. Later Nail switches to a thought-as-frozen-ice metaphor and then to a thought-as-riding-a-wave metaphor, neither of which is any better than his "whirling water" metaphor.

What Nail has given us here is the same old nonsense reductionists are always trying to get away with: the trick of trying to portray human bodies or human minds or human mental phenomena as thousands of times simpler than they are, and then offering some "explanation" for such crude little crayon sketches resulting from their ridiculous oversimplifications.

Nail tries to impress us with a little neuroscience jargon by using the phrase "cross-frequency coupling." But when he then says "it works a lot like syncopation in music," we should see that such a concept does nothing to explain how a very noisy brain could be capable of such accurate memory retrieval, accurate complex calculation and very complex organized thinking. The fact that Nail's essay fails to use either the word "memory" or "signal" shows that he doesn't understand the real problem with noisy brains: that the amount of noise in brains (and the low reliability of signal transmission across synapses in brains) should be sufficient to make it impossible for brains to be capable of accurate recall of large masses of information, and also incapable of the type of accurate signal transmission needed for complex and accurate mathematical thinking to arise from brains.

Who are these creatures Nail is describing, whose "conscious thoughts and feelings arise from the torrent of spontaneous brain fluctuations"? They sound like some science-fiction entities, but seem to bear little resemblance to human beings. Rather than having thoughts and feelings that merely pop up like bubbles in turbulent waters, from brain fluctuations that differ from minute to minute, humans have very long-lived thoughts and feelings that often persist for decades. Examples include the love of a husband and wife that can persist for 50 years, the love of a parent for his children that persists for decades, racial hatred that sadly can persist for decades, and also religious, philosophical and political thoughts that tend to be remarkably stable, enduring for decades.

at March 02, 2021 No comments:

Labels: neural noise

Tuesday, February 23, 2021

The Social Construction of Eager Community Mirages

People who believe untrue things often are convinced that their incorrect belief is based on evidence. This can occur whenever there is some enthusiastic community of researchers very interested in gathering evidence in favor of such a belief. If the community of researchers is well-motivated and well-funded, it may be able to create an illusion of having a body of evidence establishing the dubious belief it is eager to prove. We may call such a large group of researchers an eager community. We may call the misleading body of evidence created by such a community an eager community mirage.

The word "mirage" may refer to an optical illusion in which something appears to be in front of you, even though it isn't actually there (the classic example being some reflective material ahead of you that reflects the sky, fooling you into thinking there is a body of water ahead of you). The word "mirage" can also refer to something that appears real but is illusory.

Let me give a fictional example of an eager community mirage. Let us imagine a billionaire who dreams up a theory that the ghosts of dead animals live in the clouds, and that you might be able to see the ghost of your dead pet up in the sky. Having many millions to spead publicizing such an idea, we can imagine the billionaire selling many copies of some book that he wrote advancing this theory.

Let us also imagine that the billionaire decides to spend millions of dollars trying to prove his theory. He might find thousands of people very interested in proving his strange theory, and might pay them each tens of thousands of dollars to try to prove his theory, by taking photographs of clouds in the sky, and looking for shapes that look like animals.

Given such a large of researchers, getting such lavish funding, it would be likely that some type of superficially impressive "body of evidence" would accumulate. If the billionaire asked everyone of his thousands of well-funded researchers to send him a photo whenever they photographed a cloud that looked like an animal shape, the billionaire would be able to accumulate a fairly nice little collection of clouds that looked like animals (particularly if each researcher had a financial incentive for each such photo sent to the billionaire).

Would such a collection of photos be good evidence that dead animals become ghosts that live in the sky among the clouds? No, it would not be. It would simply be the amount of evidence we would expect to get for such a hypothesis, given the very large community of eager researchers, and given the funding the billionaire had given them. The body of evidence the billionaire would accumulate from such researchers would be an example of an eager community mirage. Like a mirage, the illusion of good evidence would be largely based in reality. The photos would not be faked, and would show real clouds. But the collection of such photos would not be robust evidence to prove the theory that the ghosts of dead animals rise up into the sky and live among the clouds.

In the world of scientific academia, there exist various examples of bodies of evidence that appear to be mere eager community mirages. Such bodies of evidence can arise because there is a large community of many thousands of well-funded researchers eager to gather evidence for some particular dogma believed in by a belief community of scientists.

Let us consider the body of evidence that is typically cited to support claims that the brain is the source of the human mind and the storage place of memories. We do not find in such a body of evidence any "slam dunk" experiments or studies that provide "smoking gun" evidence in favor of such claims. Instead we find a whole bunch of studies providing far weaker evidence.

Remarkably the standard for getting an experimental neuroscience paper published (and sold by some press release as being good evidence) is a very low standard, a very low hurdle to jump over. The convention is that you can get an experimental study published if your p-value is merely .05. What is the p-value? It can be roughly thought of as the likelihood of you getting a particular result if your hypothesis of a causal effect is false.

Let's imagine an example in a neuroscience experiment. Suppose I hypothesize that some region of the brain will light up more strongly than any other region under some particular example of mental activity. I then scan brains during this mental activity, and I get some result that I judge to have a p-value of .05. That means that if there is actually no connection between that region of the brain and the mental activity I have tested, I should not have got such a result by chance in more than 1 in 20 experiments I did.

A very important point is that the p-value is certainly not the likelihood about whether my result would show up if many experimenters were trying my experiment. It is merely something like the likelihood of me getting the result by chance on any particular time I tried the experiment.

Now, is it anything like convincing evidence if I do some experiment getting such a p-value of .05? Certainly not. In fact, if I do the experiment twenty times, I should expect purely by chance to get such a result about 1 time in 20, even if my hypothesis about cause and effect is totally false.

Now let us imagine a very large body of many thousands of well-funded neuroscience researchers. Altogether they have many hundreds of millions of dollars of funding, which each researcher can partially spend 30 weeks a year trying different experiments. A study estimated there were about 300,000 neuroscience papers published in a ten-year period, about 30,000 per year. The actual number of neuroscience experiments done could easily be 100,000 or more per year, because of a "file drawer" by which null results are not even written up, or not published.

How many results would we expect to get each year with a p-value of .05, purely by chance, even if brains do nothing to produce the human mind, and even if brains do not at all store memories? Very many. In fact, we should expect to get *thousands* of such experiments producing a p-value of .05 or smaller, even if brains do nothing to produce the human mind, and even if brains do not at all store memories. We also should expect to see hundreds of experiments with a more impressive p-value of only .001, purely by chance, even if brains do nothing to produce the human mind, and even if brains do not at all store memories. Since tens of thousands of neuroscience experiments are being done around the world, we would expect that purely by chance hundreds of these experiments would produce results that had a chance probability of only about .001, even if no brain cause was producing the results. We should also remember that scientists very often claim p-value results much more impressive than their observations warrant, as happened in the BICEP2 affair and the subsequently discredited "phosphine on Venus" paper.

What happens during the social construction of eager community mirages is that members of the eager community go searching for all of the results that best support the belief they want to believe in, and discuss these results in a single article or paper, often a scientific paper called a "review article." Gathered together, such results may seem impressive. But the appearance of some impressive reality is very often a mere mirage. The results discussed may be merely exactly what we would expect to get by chance, given the size of such a research community, its eagerness to establish some particular result, and the number of trials that are being done.

To give some examples, if there exists some large eager community desiring to prove some theory that the ghosts of animals live in clouds, and such a community is well funded by millions of dollars each year, we would expect that members of this community would spend many thousands of hours each year photographing clouds and looking for shapes that look like the ghosts of dead animals; and we would expect that every year some superficially impressive results would be produced by such a community. But we would merely be seeing what we would expect to get by chance, even if the ghosts of dead animals don't live in clouds. Similarly, if there exists some large eager community of neuroscientists desiring to prove some theory that brains produce minds and that brains store memories, and such a community is well funded by billions of dollars each year, we would expect that members of this community would spend many thousands of hours each year doing experiments trying to show that brains produce minds and that brains store memories; and we would expect that every year some superficially impressive results would be produced by such a community. But we would merely be seeing what we would expect to get by chance, even if brains do not produce minds and do not store memories.

Defective or questionable research practices are a key factor facilitating the social construction of eager community mirages. The weaker the standards followed, the easier it will be for the eager community to socially construct the appearance it is trying to create. In experimental neuroscience we see such defective or questionable research practices very often. To give examples:

- Scientists know that the most reliable to do an experiment is to first state a hypothesis, how data will be gathered, and how data will be analyzed, using methods called "pre-registered studies" or "registered reports." But most experimental neuroscience studies do not follow such a standard, but instead follow a much less reliable technique, in which data is gathered, and then the experimenter is free to slice and dice the data in any way he wants, trying to prove any hypothesis he may dream up after collecting the data.

- Because very many neuroscience observations are the kind of observations where subjective interpretations may be at play, a detailed and rigorous blinding protocol is an essential part of any reliable neuroscience experiment. But such a blinding protocol is rarely used, and in the minority of neuroscience experiments that claim to use blinding, the blinding will usually be only fragmentary and fractional.
- Neuroscience experiments trying to measure fear in rodents can only do that reliably by measuring heart rate in such animals (which dramatically spikes when mice are afraid). But instead of using such a reliable technique, the most common practice in rodent experiments involving fear is to use an unreliable and subjective technique involving trying to judge so-called "freezing behavior."
- Brain scanning experiments typically present misleading visuals in which differences of less than 1% in brain activity are depicted in bright red in a brain diagram, creating the incorrect impression there was some big difference in activity in such a region.
- A web site describing the reproducibility crisis in science mentions a person who was told of a neuroscience lab "where the standard operating mode was to run a permutation analysis by iteratively excluding data points to find the most significant result," and quotes that person saying that there was little difference between such an approach and just making up data out of thin air.

The neuroscientist community (very eager to prove dogmas that brains create minds and store memories) is only one example of eager communities in the world of scientific inquiry. Another such community is the origin-of-life research community, which for many decades has been eager to prove that life could have naturally originated from chance chemical reactions.

A key element in the social construction of an eager community mirage may be biased interpretation of research results. We have a gigantic example of this in the famous Miller-Urey experiment. In that experiment a small sealed glass apparatus was filled with a mixture of gases consisting of methane, ammonia and hydrogen, and subjected to continuous discharges of electricity for a week. The result was some amino acids that formed at the bottom of the apparatus. For seventy years the eager origin-of-life research community has spread the groundless idea that such an experiment did something to show a likelihood of amino acids forming in the early Earth. This claim never made any sense. Showing that some chemicals can form in a small sealed glass apparatus subject to continuous electricity discharge does nothing to show that such a formation would have occurred in the open atmosphere, both because gases and chemicals in the open atmosphere would have been many trillions of times more dispersed, and also because lightning in the atmosphere only occurs occasionally rather than continuously. But for 70 years the eager community of origin-of-life researchers has misinterpreted the experiment as one showing that amino acids would have been common in the early Earth.

Similar things happen in the neuroscientist community. Scientists put whatever "spin" on their research results that most fit in with the belief dogmas they are eager to prove. Such dubious or biased interpretations are endlessly repeated by other scientists eager to show that there is some evidence for some claim they want to believe in.

I can give a little equation summarizing what I have discussed above:

Large community eager to prove some idea + lavish funding + weak research standards + biased interpretation = occasional superficially persuasive results.

The "eager community mirage" arises when such occasional superficially persuasive results are collected from many years of effort by such a community. The result is something that may look like some body of evidence seeming to support the idea or dogma the community is eager to prove. But the result may be merely a mirage.

A physical mirage does not stand up well to close inspection. On a hot road you may see in the distance something that looks like some water on the far horizon, but driving a hundred meters closer does not make that appearance seem more concrete.

Similarly, socially-constructed eager community mirages do not stand up well to close inspection. The more closely we examine the techniques used to construct such mirages, the more likely we may be to realize that the body of evidence offered by the eager community to prove its favored beliefs is a mere mirage.

at February 23, 2021 No comments:

Labels: sociology of science

Friday, February 12, 2021

Exceptional Memories Strengthen the Case Against Neural Memory Storage

Materialist thinkers often act as if their motto was "make humans seem like something much less than humans." There are various different ways in which they do this:

- They sometimes make the utterly preposterous claim made by Darwin that there is no fundamental difference between the mental abilities of humans and the mental abilities of higher mammals, a claim contrary to all human experience.
- They senselessly classify humans as animals, and arbitrarily put the human species in an animal kingdom (given the abundant mental and behavioral differences between humans and animals, a sensible classification of organisms would be to have four

kingdoms: a microbe kingdom, a plant kingdom, an animal kingdom and a human kingdom).

- They refuse to acknowledge hundreds of years of written testimony from reliable witnesses such as doctors and scientists (and many decades of compelling experimental evidence) that humans have faculties such as clairvoyance and ESP that are beyond any biological explanation.
- When describing human mental faculties, they tend to describe them as being far weaker than they are.

It is interesting to read the writings of neuroscientists who try to portray human memory as something weak and unreliable. Again and again they will try to suggest that learning something requires multiple exposures to some source material, a claim that is contrary to the facts of actual human experience, which is that humans can very often reliably learn things after a single exposure, that people can recognize faces they have seen briefly only one time, that people can remember stories they have heard only one time, and that people can remember events they have seen only one time.

Neuroscienitsts often try to make us think that humans can't remember very well things they experienced years ago, or that each time we remember something there will be a high chance of error. Such claims are contrary to abundant human experience. It is rather obvious why neuroscientists tend to speak in such a way. The more you believe that human memory is not very reliable, and something that requires multiple exposures, the more likely you may be to believe that human memories are stored in the brain.

A neuroscientist's portrayal of weak and unreliable human memory can be refuted by citing a host of ordinary human experiences. Such a portrayal can also be refuted by citing cases of exceptional human memories. Below are some examples:

- Steven Wiltshire has repeatedly shown the ability to accurately draw an entire skyline after seeing it only one time.
- Mathematician and computer scientist Herman Goldstine wrote this about the legendary mathematician John von Neumann: "One of his remarkable abilities was his power of absolute recall. As far as I could tell, von Neumann was able on once reading a book or article to quote it back verbatim; moreover, he could do it years later without hesitation."
- According to an article in the LA Times, Kim Peek could recall the contents of 12,000 books he had read, even though his brain was severely damaged, and he lacked most or all of the corpus callosum fibers that connect the two hemispheres of the brain.
- According to one book, "John Fuller, a land agent, of the county of Norfolk, could correctly write out a sermon or lecture after hearing it once; and one, Robert Dillon, could, in the morning, repeat six columns of a newspaper which he had read the preceding evening. More wonderful still was George Watson, who... could tell the date of every day since his childhood and how he had occupied himself on that day."
- The mathematician Leonhard Euler could recite the entire *Aeneid* from beginning to end, a work of 9896 lines.
- Mezzofanti could speak very well thirty different languages.

- A four-year-old girl demonstrated on TV her ability to speak seven different languages.
- Numerous Muslim scholars have memorized all 6000+ lines of their holy book, and some did this as early as age 10.
- According to a book, "The great thinker, Pascal, is said never to have forgotten anything he had ever known or read, and the same is told of Hugo, Grotius, Liebnitz, and Euler. All knew the whole of Virgil's 'Aeneid' by heart."
- The famous conductor Toscanini was able to keep conducting despite bad eyesight, because he had memorized the musical scores of a very large number of symphonies and operas.
- It has been estimated that the Babylonian Talmud contains roughly 1,860,131 words. According to page 4 of the document here, "Stromeyer mentions Luria's famous mnemonist and the case of the 'Shass Pollaks,' who memorized all 12 volumes of the Babylonian Talmud, and Oliver Sacks has reported a similar case of a person who among other things knew by heart all 9 volumes and 6000 pages of *Grove's Dictionary of Music and Musicians*."
- According to a book, a waiter in San Francisco could recall exactly what any customer had previously ordered, even if the customer had not visited the restaurant in years.
- The artist Franco Magnani (famed as "the Memory Artist") was able to draw "photographically accurate" drawings of his hometown that he had not seen in more than 30 years.
- G. C. Leland says: " It is recorded of a Slavonian Oriental Sect called the Bogomiles, which spread over Europe during the middle ages, that its members were required to memorize the Bible verbatim. Their latest historian, Dragomanoff, declares that there were none of them who did not memorize the New Testament at least; one of their bishops publicly proclaimed that, in his own diocese of four thousand communicants, there was not one unable to repeat the entire scriptures without an error."
- Akira Haraguchi was able to recite correctly from memory 100,000 digits of pi in 16 hours, in a filmed public exhibition.
- The fascinating 47-minute video here "The Boy Who Can't Forget" documents cases of Highly Superior Autobiographical Memory (HSAM), also called hyperthymesia. According to the article here a scientist named McGaugh "is adamant that the super memory demonstrated by the small number of people he and others have identified represents a genuine phenomenon." People with such a Highly Superior Autobiographical Memory (including Jill Price and Aureilien Hayman) can recall what happened to them every day in the past ten years.
- A book tells us this: "The geographer Maretus, narrates an instance of memory probably unequalled. He actually witnessed the feat, and had it attested by four Venetian nobles. He met in Padua, a young Corsican who had so powerful a memory that he could repeat as many as 36,000 words read over to him only once. Maretus, desiring to test this extraordinary youth, in the presence of his friends, read over to him an almost interminable list of words strung together anyhow in every language, and some mere gibberish. The audience was exhausted before the list, which had been written down for the sake of accuracy, and at the end of it the young Corsican smilingly began and repeated the entire list

without a break and without a mistake. Then to show his remarkable power, he went over it backward, then every alternate word, first and fifth, and so on until his hearers were thoroughly exhausted, and had no hesitation in certifying that the memory of this individual was without a rival in the world, ancient or modern."

- Encyclopedia.com refers to the "miraculous photographic memory" of Thomas Babington Macaulay.
- Wikipedia.org states this about Daniel Tammet: "One of his most notable achievements was being able to recite Pi to 22,514 decimal places, taking him over five hours."
- According to an article on bbc.com, "Ask Nima Veiseh what he was doing for any day in the past 15 years, however, and he will give you the minutiae of the weather, what he was wearing, or even what side of the train he was sitting on his journey to work."
- Derek Paravicini was born 25 weeks early, with severe brain damage, but he has reliably demonstrated countless times the ability to very accurately play back on a keyboard any song that is played to him, note for note, even if he has never heard the song before.
- A nineteenth century work describes a similar ability in a prodigy known as Blind Tom: "The doctor then called for some one of the audience to come and play a piece of music for the first time in Tom's hearing, promising a very faithful imitation ; Miss Jones was persuaded to play a piece of her own composition, and hence unknown to Tom and the audience....When the lady was through and escorted from the stage, Tom sat down and played it through perfectly. " The next page states, "Tom executes some of the most difficult pieces of Beethoven, Mendelssohn, Bach, Gottschalk, Thalberg and others, and these he learnt by hearing them played."

Thomas Babington Macaulay

If normal human memory abilities are inexplicable as being produced by brains with very rapid protein turnover, very high levels of signal noise of several different types, and nothing like an indexing system, a position notation system or any known mechanism for reading or writing memories, brains that replace about 3% of their proteins every day, which is certainly the case, then cases of exceptional memory such as these are all the more inexplicable as being neural effects.

Brain studies of people with exceptional memories have failed to present any robust evidence for any brain difference that could explain such memories.

The paper here claims to have studied the brains of 11 people with Highly Superior Autobiographical Memory (HSAM). The abstract makes no specific claim of having found any specific difference in the brains of such people. The abstract does vaguely claim to have identified "nine structures as being morphologically different from those of control participants," but the text of the paper does not justify any claim of any significant morphological difference in the 11 people with Highly Superior Autobiographical Memory (HSAM). We read in the paper nothing different from what you would get by randomly picking 11 people and comparing their brains to 11 other random people.

It is interesting that Table 1 of this paper shows us the nine regions that were supposedly "morphologically different" from controls. There are nine up arrows to indicate little regions of neural superiority in the HSAM subjects with amazing autobiographical memory, and down nine down arrows to indicate little regions of neural inferiority in such subjects. "That's a wash," as they say: the negatives cancel out the positives. Overall there is no indication of neural superiority in these HSAM subjects with amazing memories.

A more recent paper on this topic can be read here. The paper fails to show any robust evidence of any significant brain activity difference between those with astonishing HSAM memories and normal controls. The very marginal differences discussed are merely the type of differences we would expect from comparing about 10 randomly selected people with 10 other randomly selected people.

The fact that people with vastly superior recall ability have brains that are not structurally superior (and are sometimes very structurally inferior) to those with normal recall abilities, and the fact that brain scans of such people show nothing very noteworthy are both facts that strengthen the case against the claim that memories are stored in the brain.

Postscript: Below is a quote from page 53 of the book *The Mind and Beyond* published by Time-Life Books:

"As reported in the 1990 edition of the Guinness Book of World Records, in 1967, one Mehmed Ali Halici of Turkey recited from memory 6,666 verses of the Koran in six hours. And in 1989, Englishman Tony Power memorized in correct order a random sequence of thirteen packs of shuffled playing cards – 676 cards in all – after looking at them only once. But the world record for a single eidetic memory feat may be held by Bhandanta Vicitasara of Rangoon, Burma who in 1974 correctly recited from memory 16,000 pages of Buddhist canonical texts."

at February 12, 2021 No comments:

Labels: exceptional memory, hyperthymesia, memory storage, savants

Friday, February 5, 2021

Five Hallmarks of an Information Storage System (None of Which Your Synapses Have)

It is claimed by many that the synapses of the brain are an information storage system that stores our memories. To analyze whether this claim is credible, let us look at some common characteristics of information storage systems, and see whether synapses have any such characteristics.

Characteristic #1: An “alphabet” of symbolic tokens consisting of at least two types of tokens.

By an alphabet of symbolic tokens, I mean a set of symbols that can be used in the writing of symbolic information. Below are some examples:

1. In English books, this alphabet of symbolic tokens consists of the letters of the alphabet and the various punctuation marks.
2. In DNA this “alphabet” of symbolic tokens consists of the four types of nucleotide base pairs found in the DNA molecule (adenine, cytosine, thymine and guanine).
3. In early Egyptian hieroglyphics, there was an “alphabet” of different pictogram symbols, each of which stood for some particular thing.
4. In computers that store information using binary, there is an “alphabet” consisting of only two things: a magnetic mark standing for 1, and another magnetic mark (or absence of a mark) that stands for 0. Different combinations of such binary characters stand for particular letters in the alphabet.

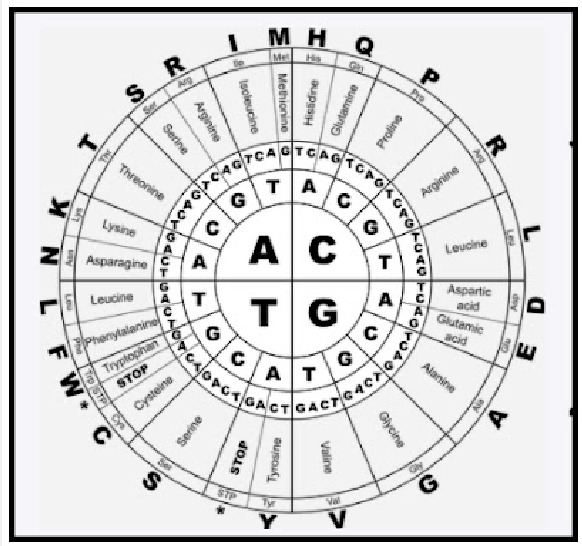
Characteristic #2: A recurring tendency for one or more of these symbolic tokens to represent some particular thing.

In an information storage system such as a book it is not enough to simply have some set of symbolic tokens. There must also be some tendency for particular combinations of these tokens to represent some thing.

In the simplest type of information storage system, a single token represents one particular thing. For example, we may consider road signs as an information storage system in which a single token stands for one thing. On the left is a token standing for "a gas station," and on the right is a token standing for "pedestrians crossing."

In a more complex information storage system, it is ususally the case that particular combinations of tokens stand for some particular things. For example, in the English language the combination of the tokens "c," "a" and "t" stand for a cat.

Below we see a representation of the genetic code used by DNA. There are four tokens, A, C, T and G, which are the nucleotide base pairs adenine, cytosine, thymine and guanine. Particular combinations of these base pairs stand for particular amino acids. Looking at the chart below, and moving your eye from the center to the edge of the chart, you can see examples of these combinations and what they mean. For example, a combination of guanine (G), cytosine (C) and adenine (A) stands for the amino acid named alanine.



Characteristic #3: A sequence of these tokens in which particular tokens of the "alphabet" are repeated multiple times.

Below are some examples of this type of sequence:

1. On a page of an English book, we have a long sequence of letters, and particular combinations of these stand for particular words.
2. In a DNA molecule, there is a long sequence of nucleotide base pairs that collectively specify genetic information.
3. On a computer hard drive, there are files consisting of long sequences of magnetic marks (the equivalent of 1's and 0's), that store information in particular types of computer files.

Characteristic #4: Some physical arrangement by which it is possible for the sequence of tokens to be read.

In order for you to have a meaningful information storage system, there must be some arrangement by which the stored information can be read, so that the stored sequence is retrieved or read. Imagine a system by which you spell out your text messages in scrabble blocks, and then toss the scrabble blocks to the bottom of a large trash can. That is not a workable information storage system, for it offers no hope of retrieving the original messages.

Some examples of systems that meet this characteristic are as follows:

1. A book is an arrangement by which it is possible for a human to conveniently read all of the symbolic tokens in the book, in the correct sequence. The arrangement of tokens and the bindings of the pages make it easy for a sequential reading of the tokens.
2. A DNA molecule is an arrangement by which it is possible to conveniently read all of the tokens (the nucleotide base pairs) in the correct sequence. The physical structure of the DNA molecule (a long string-like structure) make this sequential reading fairly easy.
3. A tape playback and recording system such as a VCR had a physical arrangement by which a slowing turning tape passed by a read/write

head, allowing magnetic marks on the tape to be read in a particular sequence.

Characteristic #5: Stability

Most of the information storage systems we use have stability. For example, once words have been printed on paper, the information will last for a very long time. And once something has been stored on a hard drive, the information can last in exactly the same state for years. Video tapes also last for many years. The information stored in DNA is also very stable. You still have basically the same DNA information in your cells that you had when you were born.

Do Synapses Have Any of These Characteristics?

Now let us look at the synapses of the brain, and ask: do they meet any of these five hallmarks of an information storage system? We will find no match to these characteristics merely by mentioning DNA in synapses, because synapses do not have DNA (DNA in the brain is found in neurons, but not in the synapses that connect neurons).

It seems that synapses do not have the first of these hallmarks. No one has ever discovered anything like an "alphabet" of symbolic tokens that could be used by synapses to store information. Some might argue that maybe the strength of a synapse acts like a symbolic token. But a synapse could have any of millions of different strengths, just like a muscle can have any of millions of different strengths. There doesn't seem to be any built-in characteristic of synapses allowing synapses to act as particular symbolic tokens, or to store symbolic tokens.

There is no evidence that synapses have the second of these characteristics. We can find no combinations of synapse tokens that stand for particular things, because no one has discovered any tokens at all in synapses.

It also seems that synapses do not have the third of these hallmarks of a system for storing symbolic information. No one has found any repetition of tokens in synapses.

It also seems that synapses do not have the fourth of these hallmarks of a system for storing symbolic information. There are countless synapses in the brain that exist in three-dimensional space, like tangled vines in a very densely packed jungle, or like strands of spaghetti in a huge pot filled with enough spaghetti to feed 100 children. There does not exist anything in the brain corresponding to a synapse reader that might sequentially read some stream of tokens in synapses if they happened to exist in synapses.

It also seems that synapses do not have the fifth of these hallmarks of a system for storing information. The proteins in synapses are short-lived, having an average lifetime of less than two weeks. It has been estimated the 3% of brain proteins are replaced every day. The paper here states, "Experiments indicate in absence of activity average life times ranging from minutes for immature synapses to two months for mature ones with large weights." So synapses lack the stablility that characterizes information storage systems.

It seems, therefore, that synapses have none of the main characteristics of information storage systems. Synapses no more resemble an information storage system than an outdoor lump of mud resembles an information storage system. So why do so many neuroscientists maintain that synapses are some storage system storing your memories? It's merely because they have committed themselves to the silly idea that memories must be stored in brains. It would be much better if neuroscientisists were to honestly say this: "We have found nothing in the brain that resembles a system for storing information that minds learn."

The scholar Robert Crookall has collected very many accounts of out-of-body experiences which you can read online here, here and here. The great similarities of such accounts, the fact that they are so often reported as spontaneously occurring in healthy, normal people, and the fact that things observed in such experiences are often verified are all indications that such accounts are not merely hallucinations. In such accounts we see people reporting no dimming of memory when they reported floating out of their bodies. Such accounts (senselessly ignored by almost all neuroscientists) provide a clue as to what is the real repository of memory: some soul or spiritual faculty that is very different from the brain.

at February 05, 2021 1 comment:

Labels: brain shortfalls, out-of-body experiences, synapse theory of memory

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Head Truth

The huge case for thinking minds do not come from brains

Tuesday, January 26, 2021

A New Paper Suggests Scientists Have No Solid Theory of Neural Memory Storage

For years scientists have been advancing the groundless theory that human memories are stored in synapses. Such scientists have ignored very strong reasons for concluding that this idea cannot possibly be correct. The first reason is the very short lifetimes of the proteins in synapses, which last only a thousandth of the longest length of time that humans can retain memories. Synapse proteins have an average lifetime of less than two weeks, but humans can reliably remember things for more than 50 years, a length of time more than 1000 times longer than two weeks. I got a reminder of this yesterday, when I saw in print a reference to the 1970-1971 TV show "Nanny and the Professor," a show I haven't thought about (or heard mentioned or read about) in 50 years. I remembered correctly the name of the little-known female star of the show.

If it were true that memories were stored by a strengthening of synapses, the formation of a memory would be a slow process. The only way in which a synapse can be strengthened is if proteins are added to it. We know that the synthesis of new proteins is a rather slow effect, requiring minutes of time. In addition, there would have to be some very complicated encoding going on if a memory was to be stored in synapses. The reality of newly-learned knowledge and new experience would somehow have to be encoded or translated into some brain state that would store this information. When we add up the time needed for this protein synthesis and the time needed for this encoding, we find that the theory of memory storage in brain synapses predicts that the acquisition of new memories should be a very slow affair. But it is a fact of human experience that humans can form long-term memories instantly. You can often remember the plot of a movie months after seeing it only one time, and you can often remember months later experiences you had only one time, even if you never had any thought about the movie after seeing it, and never thought about the experience after having it. Ask a man to tell the whole plot of a movie just after it ends, and he will be able to tell the whole story. He won't say that he doesn't remember the last few minutes of the movie, and ask you to wait for his memory formation to catch up. And if you ask the man at the end of the movie to tell what happened at the end of the movie, he will have no trouble remembering, a few seconds after the movie's end.

A new science paper gives us an indication that scientists have no solid theory of neural memory storage. The paper is entitled "What If Memory Information is Stored Inside the Neuron, Instead of in the Synapse?" We read the following, which refers to a numbered list of papers given at the end of the paper:

Total Pageviews

112,501

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"Conventional wisdom has it that memory information in the brain is stored in the synapse...In neuroscience literature, there is a growing number of findings against the synaptic hypothesis. For example: 'Long term memory storage and synaptic change can be dissociated' [13]; 'Increased synaptic strength that is the result of cellular consolidation is thus not a critical requisite for storing a memory' [14]; 'When enhanced synaptic strength between engram cells is abolished, the memory is not'"[15]; 'Memory does not reside in altered synaptic conductances.' [16]. As summarized succinctly in [17]: (we do not know) 'the physical medium in nervous tissue that is modified in order to preserve these empirical quantities for use in later computations.' "

This is quite a confession. A hypothesis of synaptic memory storage is still popular, despite the fact "there is a growing number of findings against the synaptic hypothesis." This is what happens very frequently in scientific academia. Clinging to an achievement legend that is unfounded, scientists continue to believe they understand something they do not at all understand, as evidence continues to accumulate that their theory on the matter is wrong. This has been going on in one form or another through most of the history of scientific academia. Call it ideological inertia, which is the opposite of being able to quickly modify assumptions, what me may call hypothesis agility.

The new paper refers us to a previous article in which a neuroscientist confesses his lack of understanding about a neural basis for memory and thought:

"We do not yet know how the brain implements the basic elements of computation (the basic operations of arithmetic and logic). We do not yet know the mind's computational primitives. We do not yet know in what abstract form (e.g., analog or digital) the mind stores the basic numerical quantities that give substance to the foundational abstractions, the information acquired from experience that specifies learned distances, directions, circadian phases, durations, and probabilities. Much less do we know the physical medium in nervous tissue that is modified in order to preserve these empirical quantities for use in later computations. Already as an undergraduate, I wanted to know the physical basis of memory in the brain. I begin to think that we are not to know this in my lifetime, but science often progresses in sudden and unexpected spurts, so I still hope to know it."

This statement is a commendable confession, but it should have gone a little further. The scientist should have said "we do not know whether the brain implements any such thing as thought or computation," and "we do not know whether memories are stored through any such thing as a modification of nervous tissue."

Having shaken our confidence in a synaptic theory of memory, the "What If Memory Information is Stored Inside the Neuron, Instead of in the Synapse?" paper proceeds to discuss a theory of memories stored in neurons. But the authors provide no evidence for such a theory, which would suffer from problems as great as the theory of a synaptic storage of memory. Nor do the authors even present any hypothetical description of how neurons could store information. We are left with the impression that our scientists have no solid theory of how a brain could store memories.

It is interesting that the paper authors feel compelled to spend a good part of their paper speculating on alternate ideas about the purpose of synapses. Strange that even though we kept being told the far-fetched claim that our bodies merely reflect purposeless random mutations, our scientists so often tend to keep speaking as if everything in the body must have a purpose.

at January 26, 2021 2 comments:

Labels: memory storage

Saturday, January 16, 2021

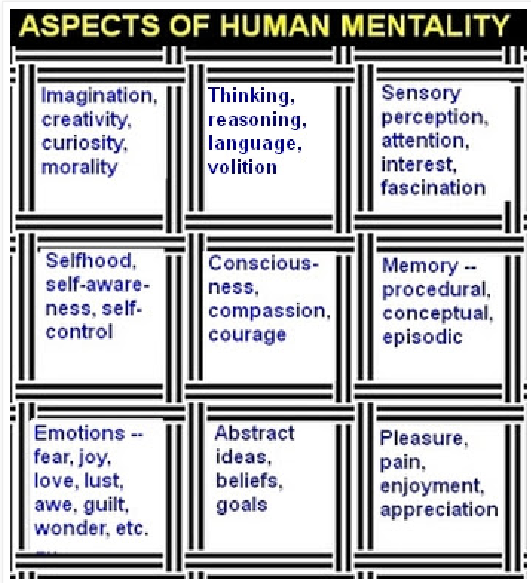
Fallacious Emptiness of a "Mind Is Like Wetness" Account

At the Aeon web site recently, we have a post by philosopher Massimo Pigliucci entitled "Consciousness Is Real." At some length Pigliucci makes a superfluous rebuttal of the boundlessly silly claim that consciousness is not real (a claim on the same credibility level as the claim that nothing exists). Then Pigliucci offers his explanation for the mind, which is something very lame indeed: an analogy that the mind is like wetness. I can see why Pigliucci has preceded this "mind is like wetness" account by attacking the mindless idea that consciousness does not exist. It is so that some readers might think something like "the other idea was crazy, but this idea makes sense." But we should not think along such lines. It is very silly to claim that consciousness does not exist, and it is also silly to try to explain the human mind by saying that it is rather like wetness.

Pigliucci follows the typical strategy of reductionists offering goofy explanations for minds. The strategy is to use the word "consciousness" as much as possible to refer to human mentality. What's wrong with that is that consciousness is merely one aspect of human mentality. Human mentality consists of very many things, such as:

- the ability to perceive the outside world;.
- the ability to form memories;
- the ability to recall memories of things learned or experienced decades or a half-century ago;
- the ability to instantly retrieve facts when given some prompt such as a name, place or event;
- the ability to understand complicated things;
- the ability to form abstract ideas;
- the ability to form beliefs and maintain beliefs;

- the ability to feel certain emotions;
- the ability to experience mental and physical pleasure and delight;
- the ability to have paranormal experiences that are not neurally explicable.



A person who talks about a "problem of conssciousness" rather than a "problem of human mentality" is like some person who describes baseball as "base-running" and who then tells us that gorillas can play baseball because gorillas can run between bases. Such talk would be very fallacious, because baseball is a complex thing involving much more than just base-running: things like pitching, umpiring, hitting, fielding and score-keeping. Similarly, human mentality is a very complex thing involving a wide variety of different capabilities and aspects. The instant we hear someone mainly using the word "consciousness" to refer to the human mind, we should suspect that we are once again being subjected to a ridiculous reductionism, in which a person is trying the old trick of trying to explain something by first describing it as a hundred times simpler than it is.

Speaking often rather as if human mentality is mere consciousness, like someone speaking as if baseball is mere base-running, Pigliucci tries to explain the mind by suggesting that consciousness is an "emergent property" like wetness. He states, "I think of consciousness as a weakly emergent phenomenon, not dissimilar from, say, the wetness of water (though a lot more complicated)."

In explaining the idea of emergence, an emergentist will typically give an example involving water. Water is composed of hydrogen and oxygen, and neither has any such property as wetness. But when oxygen and hydrogen are combined to make water, then we have something with the property of wetness. It is claimed that such a property could never be predicted by just analyzing hydrogen or just analyzing oxygen.

According to the emergentist, this example shows that amazing new properties can arise when matter combines in different ways. The emergentist tells us that human consciousness is simply such a property, a property that just arises from certain complex combinations of matter.

- Why Brains Are Not Suitable for Storing Long Sequences Like Humans Remember
- Why Brain Scans Don't Show Brains Make Minds
- Why Strokes, Alzheimer's Disease and Drunkenness Don't Prove the “Brains Make Minds” Dogma
- Synaptic Density Studies Contradict the Most Popular Memory Theory
- The Rare "Total Recall" Effect That Conflicts with Brain Dogmas
- Physical Connections Do Nothing to Explain Cognition
- The Sociological Reasons Why Bad Explanations Persist in Academia
- Split-Brain Cases Conflict with "Brains Make Minds" Dogma
- Why So Much of Neuroscience News Is Unreliable
- An Analogy Clarifying Why the "Brain Stores All Your Memories" Dogma Is Untenable
- Why Darwinism Fails to Explain the Human Mind
- What Is It That a Brain Does?
- Cloud Computing and a Non-Local Model of Consciousness
- Why We Do Not Understand the Origin of Complex Biological Innovations
- Our Minds May Arrive Top-Down Not Bottom-Up
- Fancy New Technology Fails to Prove Memory Dogmas
- The Argument for Determinism Collapses Once We Discard the "Minds Come from Brains" Dogma
- Animal Experiments Conflicting with the Dogma That the Brain Stores All Memories
- Memory Recall Reality Versus the "We Can't Remember Well" Bunk of Professors
- Neuroscientists Keep Using Misleading Coloring in Brain Visuals
- Most Scientists Don't Follow Formal Evidence Standards, Unlike Judges
- Experimental Evidence for ESP Is Well-Replicated
- Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades
- NIH Bets $1,434,188 That Synapses Don't Store Memories
- A New Case of Very Large Brain Damage and Normal Mental Function
- When Clue-Blind Professors Ignore All the Signs

But this reasoning is not sound. The human mind is not a property of the brain or a property of the body.

In general, a property is a simple intrinsic characteristic of something, which can be completely expressed by giving a single number. For example, the properties of a rock are hardness, weight, height, width, length, and depth. Each of these simple properties can be expressed by a single number. (You may not think hardness can be expressed by a number, but there is something called the Mohs scale used to numerically express the hardness of rocks.) We might also think of the color of the rock as being a property, although that requires a simplification (since the rock will actually be multiple colors). If one makes such a simplification, then that color can also be expressed as a single number, such as a number on a color scale. Even wetness can be expressed by a single number (we might, for example, create a wetness scale of 1 to 10, and reasonably assign liquid water a value of 10, a thick soup a value of about 5, and arid dust with a value of 1 or 0).

But the human mind is not a simple characteristic that can be numerically expressed by a number. When we consider all of the facets of the human mind (memory, intelligence, personality, emotions, spirituality and many others), we certainly do not have anything like a simple characteristic that can be expressed by a number. The human mind is also something *mental*, something much different from a physical property such as width, weight, or wetness.

In light of such facts, the argument of the emergentist falls apart. To some it may sound persuasive to make this shallow, sketchy comparison:

"When we combine hydrogen and oxygen, we see the emergence of a new, unexpected property of wetness. This can help explain how our consciousness could suddenly arise from the combination of certain types of neurons."

But it does not at all sound convincing to make this deeper, more complete comparison.

"When we combine hydrogen and oxygen, we see the emergence of a new, unexpected property of wetness, which is a simple, physical property that can be expressed by a single number. This can help explain how certain combinations of physical neurons could produce human mentality that is not physical, mentality that is extremely complicated and multifaceted, and not capable of being expressed by a single number."

Obviously the latter argument does not work. Our minds are not at all a property. They are far too complicated, multifaceted, and functional to be a property, which is a simple physical thing, like a single facet of something.

An additional reason for rejecting "mind is a property" reasoning comes from near-death experiences. In these experiences a person will often report floating above his body, and looking down on it. A property is something that cannot be separated from the object with which it is associated. So it would be absolutely nonsensical to say something like, “The rock is on the left side of the room, but the length of the rock is on the right side of the room,” just as it would be nonsensical to say, “I have your bicycle in my garage, but I have the weight of your bicycle in my kitchen.” But judging from near-death experiences, it is possible for a human mind to be separated from the brain, at least briefly. Since properties can never be separated from their associated objects, such experiences supply an additional reason for thinking that the human mind cannot be considered a property of the brain.

Pigliucci states this: "It follows that an explanation of phenomenal consciousness will come (if it will come – there is no assurance that, just because we want to know something, we will eventually figure out a way of actually knowing it) from neuroscience and evolutionary biology, once our understanding of the human brain will be comparable with our understanding of the inner workings of our own computers." This is actually an embarrassing confession, the confession that evolutionary biology and neuroscience currently have no explanation for the human mind. Pigliucci merely suggests that maybe some day they will, after we understand the details of the brain better. Got it, professor -- you have no explanation for the human mind, but you are just keeping your fingers crossed that one day such an explanation will arise, from more activity in two areas that have failed thus far to produce such an explanation. Why would someone think that after 150 years of failing to produce an explanation for minds, that evolutionary biology and neuroscience would one day produce them? That's kind of like saying, "I have failed to find my car keys after 100 days of looking inside my living room, but if I ever find them, I will find them by further looking in my living room."

We already understand the physical details of the brain very well indeed. We can examine it with incredible detail using technologies such as two-photon microscopy. Billions have been poured into multi-year projects clarifying the brain's physical details. What we have learned are facts (discussed in great detail in the posts of this site) that contradict all claims that the brain is the source of our mentality. We know, for example, that no has found any sign of any stored information in brains other than the genetic information in every cell. We know that the proteins in brains are so short-lived that they have average lifetimes of only two weeks or less --- 1000 times shorter than the longest length of time that humans can remember things. We know that because of factors such as cumulative synaptic delays and the relatively slow speed of dendrites, brain signals in the cortex only travel relatively slowly, way too slowly to explain instant human recall and the blazing calculation speed of math savants. We know that protein formation in brains takes minutes, too long to explain human memories that can form instantly. We know the brain has no sign of any indexing or position notation system that might explain instant memory recall. We know that there is nothing in the brain like the read mechanism and write mechanism in computers. We have found no trace of any encoding system in the brain by which information learned in school or daily experience could be translated into permanent neural states or synapse states. In short, we have learned very much that discredits the idea that the brain is the source of our minds and the storage place of our memories. There is no credible scenario under which additional neuroscience findings will give us a neural explanation for our minds.

Pigliucci insinuates that some special arrangement of neurons in the brain produces mental phenomena, and says "it is not just how they are arranged in the brain that does the trick." When water is frozen, water molecules have a kind of ordered lattice arrangement; but pure ice isn't wet. When water is wet in a liquid state, water molecules are not arranged in any structure (in terms of structure, a barrel of water is like a barrel of sand). The fact that you get wetness from molecules that have no arrangement does nothing whatsoever to suggest that mental phenomena would arise from some special arrangement of neurons.

- Don't Be Fooled: Well-Trained Chatbots Aren't Minds
- What the Neuroscientist Should Have Said When Asked About Mind Uploading
- Cognitive Effects of Epilepsy Surgery Clash with "Brains Make Minds" Dogma
- Evolution Does Not Explain DNA, DNA Does Not Explain Bodies, and Bodies Do Not Explain Minds
- "Brain Chemical Imbalance" Theory Is Fading Out as an Explanation for Mental Illness
- Why Plasticity and Neurogenesis Fail to Explain Minds That Work Well After Massive Brain Tissue Loss
- They're Calling It a Huge Memory Research Fraud, But Is It Only the Tip of the Iceberg?
- So Much Misleading Talk Occurs in Claims of a Scientific Consensus
- Shrink-Speaking About a Mere "Problem of Consciousness" Is As Wrong As Shrink-Speaking About a Mere "Problem of Human Shape Origination"
- Longtermism Is Fueled by a Goofy Belief in Computer-Generated Lives
- Given Their Narrow Studies and Slim Narrow PhD Dissertations, Why Are We So Swayed by Neuroscience PhDs?
- Some of the Weak Papers Neuroscientists Cite As Evidence for Their Chief Claims
- For Insight About Your Brain and Mind, Ponder the Never-Founds
- TV Medical Dramas Give Us Wrong Ideas About Minds and Death
- Brain Imaging Shows No Appreciable Neural Correlates of Memory Activity
- The Evidence Inversion Syndrome Blights Academia
- Poorly Designed Brain Scan Experiments Needlessly Put the Needy at Risk
- Science Literature Is Full of Misleading Claims About Brain Waves
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- If Neuroscientists Acted Like Cosmologists, They Might Say You Have an Invisible "Dark Brain"
- Exceptionally Fast Thinking Cannot Be Explained by Slow Brains Like We All Have
- Scientists and Clergy Have Much in Common
- 30 Things That Would Never Occur If Prevailing Neuroscientist Dogmas

Speaking of wetness, if we think about water we might get some clue about a source of minds. Let's imagine some father and son in Kansas 3000 years ago speculating about the source of rainfall:

Son: Dad, where does rain come from?
Father: I don't know, but things come from similar things. Branches come from trees, not rocks. So there's probably some big source of water, somewhere, and I bet the rain somehow comes from that.

The father in this case would have been on the right track, because the water in clouds arises through evaporation from the water in the ocean. And the ocean is the "big source of water" that the father speculated about. An intelligent speculation about a source of human minds would be that there is some great mind source or oceanic mind, and that mind comes from that source, directly or indirectly, one type of thing arising from a similar type of thing. That makes more sense than believing that mind arises from something totally unlike mind (matter). If we suspect that a human mind comes from some source that is itself mental, that is like suspecting that a branch came from a tree. If we believe that a human mind comes from a brain, that is like thinking that a branch came from a stone.

at January 16, 2021 1 comment:

Saturday, January 2, 2021

Prevailing Brain Dogmas Cannot Explain Hypnotic Phenomena

Most of the main normal mental phenomena of humans cannot be explained by prevailing dogmas that everything mental is caused by the brain. Humans can form new memories instantly. If suddenly someone sticks a gun in your mouth, you will instantly form a permanent new memory. Neuroscientist attempts to explain memory formation (through vague crude ideas such as "synapse strengthening") fail miserably when we consider facts such as the short lifetimes of synapse proteins (only a few weeks), and the fact that such a synapse strengthening would take too long to explain the instant formation of new memories. Neuroscientists cannot explain how you can instantly recall a memory when asked a question, or how learned knowledge could ever be translated into neural states or synapse states. Neuroscientists also cannot explain how a brain could possibly cause a person to be conscious, or to have a unified self. Our professors of neuroscience are also utterly unable to explain such basic human phenomena as imagination and the creation of new ideas. No one can give a coherent explanation as to how a single neuron or a billions could ever come up with a novel idea.

Besides failing to credibly explain normal human mental phenomena, we cannot credibly explain a large variety of abnormal human mental phenomena through theories that our minds come from our brains. For example, materialists are unable to credibly explain phenomena such as apparition sightings and near-death experiences.

The theory that your brain makes your mind also cannot explain a wide variety of baffling phenomena that occur under hypnosis. Such phenomena have been observed for more than two hundred years. What the average person knows about strange occurrences during hypnotic trances is only a fraction of the baffling anomalies that have been historically documented.

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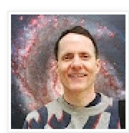

Mark Mahin

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March 2023 (2)

Let us look at some of the strange phenomena that have been well-documented as occurring during hypnotic trances.

Phenomenon #1: a failure to remember what happened under hypnosis, except when returning to a hypnotic trance, or when executing a post-hypnotic suggestion.

First, let us look at a well-known aspect of hypnosis that is inexplicable under prevailing dogmas about the brain and mind. I refer to the fact that a hypnotized person will be able to hear speech and respond to questions. But when he is awoken from a hypnotized person, that same person will typically be unable to remember anything that went on during the hypnotic trance. But if that person is then put under hypnosis again, he will be able to remember what previously occurred during his hypnotic trance.

Such a tendency is mentioned in an 1851 book on hypnotism (when it was then commonly called animal magnetism). The book by William Gregory MD stated this (using the word "sleeper" for a hypnotized person, and "sleep" for a hypnotic trance):

"As a general rule, but not a rule without some exceptions, the sleeper does not remember, after waking, what he may have seen, felt, tasted, smelled, heard, spoken, or done, during his sleep ; but when next put to sleep, he recollects perfectly all that has occurred, not only in the last sleep, but in all former sleeps, and, as in the ordinary state, with greater or less accuracy, although usually very accurately indeed."

Such a failure to remember what occurred in the hypnotic state is all the more baffling when we consider that a person may be hypnotized and told to perform some simple action after a certain interval, and then woke up from the hypnotic state. The person may then perform such a post-hypnotic suggestion after the interval passed. So it is as if there is no memory of the post-hypnotic suggestion in conscious memory, but there is memory of the post-hypnotic suggestion in some subconscious memory, that then affects conscious actions after a certain interval passes. I will discusse below some specific examples of this.

Phenomenon #2: an insensitivity to pain during a hypnotic trance.

It was documented by many nineteenth century writers that under hypnosis a person could lose all sensitivity to pain. For example, in a 19th-century work, we read of a woman in 1829 who had her breast removed to treat cancer. The woman had no anaesthesia, but was merely hypnotized. The account says the woman "did not betray the least symptoms of pain...she talked tranquilly, during the whole time." Pages 65-67 of the same work describes another similar case of a younger hypnotized woman in 1854 who showed no signs of pain as her breast was surgically removed, as she smiled through the surgery.

Using the word "somnambulists" to refer to those hypnotized, an 1831 report by a committee of French medical authorities, under the auspices of the Royal Academy of Medicine, stated the following:

"The greater number of the somnambulists whom we have seen, were completely insensible. We might tickle their feet, their nostrils, and the angle of the eyes, with a feather—we might pinch their skin, so as to leave a mark,

prick them with pins under the nails, &c. without producing any pain, without even their perceiving it. Finally, we saw one who was insensible to one of the most painful operations in surgery, and who did not manifest the slightest emotion in her countenance, her pulse, or her respiration."

The author of one work tells us of his personal observations on this topic, using "mesmeric" to mean "hypnotic":

"In the first experiment I ever tried to assure myself of the reality of mesmeric anathsesia, a young woman was put to sleep and eight bad teeth were extracted from her ulcerated gums without her having any consciousness of it. But her inner consciousness being at the same time aroused, she was able to tell me the time by a clock in a house eight miles away, as I verified the next day by comparison with my watch."

The report above combines two inexplicable aspects of a hypnotic trance, an insensitivity to pain, and also clairvoyance during a hypnotized state, which is abundantly attested to in other reports discussed here and here and here.

On pages 27-28 of a book by Dr. James Esdaile he lists a host of dramatic painless surgeries he performed without using anesthesia, but only hypnosis on patients. The list includes about 20 amputations, and 200 removals of scrotal tumors ranging from 10 pounds in weight to more than 100 pounds in weight. Another book on this topic by Esdaile can be read here.

In the following quote from a nineteenth century work, we learn of a great irony: that physicians took up a chemical method of anesthesia, one which would often kill people, rather than using hypnotic methods of anesthesia that were proving very safe and effective:

"In Dr. Brown Sequard's lectures upon 'Nervous Force,' delivered in Boston in 1874, he speaks of this form of anaesthesia as follows :

'As regards the power of producing anaesthesia, it seems to me unfortunate that the discovery of ether was made just when it was. It was, as you well know, in 1846 or 1847 that the use of ether as an anaesthetic was begun. It started from this city (Boston). At that time in England, Dr. Forbes was trying to show from facts observed in England, and especially in India, from the practice of Dr. Esdaile, that something which was called Mesmerism, but which, after all, was nothing but a peculiar state of somnambulism induced in patients, gave to them the idea that they were deprived of feeling ; so that they were in reality under the influence of their imagination, and operations were performed that were quite painless. I say that it was a pity that ether was introduced just then, as it prevented the progress of our knowledge as to this method of producing anaesthesia. My friend Dr. Broca took it up in 1857-8 and pushed it very far; and for a time it was the fashion in Paris to have amputations performed after having been anaesthetized by the influence of Braidism or Hypnotism. A great many operations were performed in that way that were quite painless. But it was a process that was long and tedious, and surgeons were in a hurry and gave it up. I regret it very much, as there has never been a case of death from that method of producing anesthesia, while you well know that a great many cases of death have been produced by other methods.' "

A modern paper reports a similar result: hypnosis producing dramatic reduction in headache pains. We read this:

September 2018 (1)
August 2018 (1)
July 2018 (1)
June 2018 (1)
April 2018 (30)

Labels

- "brain as computer" metaphor
- academia dysfunction
- adult neurogenesis
- AI
- binary memory storage theory
- brain changes with age
- brain connectivity
- brain effect on personality
- brain imaging
- brain injury
- brain research projects
- brain shortfalls
- brain signal speed
- brain surgery
- brain uploading
- brain waves
- claims of mind reading by brain scans
- claims of neural correlates of mental activity
- COVID-19
- decisions
- default mode network
- dendritic spines
- depression
- distributed recall hypothesis
- DNA
- EEG studies
- emergence
- epilepsy
- ESP
- evolution
- exceptional memory
- exceptional speed of thinking
- file drawer effect
- fraud
- free will
- genes
- global workspace theory
- groupthink
- health hazards in neuroscience experiments
- hemispherectomy
- high mental function despite large brain damage

"Symptoms of headache and vertigo were treated using direct hypnotic suggestions of symptom relief in 155 consecutive skull injured patients. Posttraumatic headache and vertigo were completely relieved after an average observation period of 1 year 10 months in 50% and 58% of the patients, and partially relieved in 20% and 16% respectively."

The difference here is that this pain reduction comes after the patient leaves the hypnotized state. On page 292 of the book *Human Possibilities: Mind Exploration in the USSR and Eastern Europe* by Stanley Krippner,, we read about an experiment by J. A. Stern and his associates. Twenty people were inflicted with pain. Pain-relief techniques were tested on each of them, including hypnosis, acupuncture, aspirin and a placebo, and injections of morphine, We read that "hypnosis proved to be the most effective pain-reduction agent followed by morphine and acupuncture," and that the other methods were not effective.

Phenomenon #3: an insensitivity to sound during a hypnotic trance.

It was documented by many nineteenth century writers that under hypnosis a person could lose all sensitivity to sound. A nineteenth century work says this about hypnotized patients, using the word "magnetizer" for a hypnotist and "somnambule" for the hypnotized person:

"Sensitiveness is entirely abolished. The patient hears only the voice of the magnetizer and that of the person whom the latter places en rapport with him. His deafness is absolute for all noises that occur, of whatsoever intensity. In an experiment made at Paris, a sceptic fired a pistol near the ear of a somnambule. The latter heard nothing. The insensibility is not less complete in other parts of the body. We may bury needles in the flesh without the patient feeling the least pain. He suffers only when he awakes. The most painful surgical operations have been performed on magnetized subjects, and they had only learned what had happened after they had come out of their sleep."

Phenomenon #4: clairvoyance and ESP during a hypnotic trance.

It was documented by many nineteenth century writers and authorities that under hypnosis a person could show paranormal powers of clairvoyance or telepathy. In the long posts here and here and here I discuss some of the abundant observational evidence for such a thing. I may note that the reality of clairvoyance under hypnosis was firmly declared by a high-prestige French academic committee, a six-year investigation of the Royal Academy of Medicine that issued its report in 1831.

During the nineteenth century hynotized people were often asked to engage in a kind of thought sharing or "mind meld" with another person, a state that was called being *en rapport* with that person. A nineteenth century work on hypnotism gives this summary, using the word "sleeper" for a hypnotized person:

"Thought reading presents itself in every possible variety of form. The sleeper, being placed en rappor*t with any person, can often describe, with the greatest accuracy, the subject that occupies the thoughts of that person. It may be an absent friend, or his own house, or that of another, or his drawing-room, bed-room, study, &c. &c. All these things the sleeper perceives, as they pass through the mind of the experimenter, and describes with great minuteness and accuracy, so as to excite our astonishment. Or he goes further ; he not only perceives the present, but the past thoughts of the*

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

person en rapport with him ; he shares his memory. Thus he will mention facts, no longer so existing, but remembered by the experimenter. Nay, he goes still further even than this ; for he perceives things once known to, and now forgotten by, the experimenter, who very often contradicts the sleeper, and persists in maintaining his own opinion, until, on further enquiry, he not only finds him to be right, but himself is enabled to recal the fact, which had, as we say, escaped his memory."

Many specific case examples of such a thing can be found in the three posts mentioned above (the posts here and here and here). A nineteenth century work *Letters to a Candid Inquirer, on Animal Magnetism* by William Gregory gives some very specific numerical details relating to clairvoyance in hypnotic trances (referred to below as "mesmeric sleep"):

"Major Buckley has thus produced conscious clairvoyance in 89 persons, of whom 44 have been able to read mottoes contained in nut-shells, purchased by other parties for the experiment. The longest motto thus read, contained 98 words. Many subjects will read motto after motto without one mistake. In this way, the mottoes contained in 4860 nut-shells have been read, some of them, indeed, by persons in the mesmeric sleep, but most of them by persons in the conscious state, many of whom have never been put to sleep. In boxes, upwards of 86,000 words have been read; 'in one paper, 371 words. Including those who have read words contained in boxes when in the sleep, 148 persons have thus read. It is to be observed that, in a few cases, the words may have been read by thought-reading, as the persons who put them in the boxes were present; but in most cases, no one who knew the words has been present, and they must therefore have been read by direct clairvoyance. Every j)recaution has been taken. The nuts, inclosing mottoes, for example, have been purchased of 40 different confectioners, and have been sealed up until read. It may be added, that of the 44 persons who have read mottoes in nuts by waking or conscious clairvoyance, 42 belong to the higher class of society; and the experiments have been made in the presence of many other persons. These experiments appear to me admirably contrived, and I can per- ceive no reason whatever to doubt the entire accuracy of the facts."

Later in the same work we read many detailed descriptions of clairvoyance under hypnosis, one of which is the account below (which uses the "magnetic sleep" to refer to a hypnotic trance):

"E., in the magnetic sleep, as I saw more than once, could see perfectly what passed behind her, her eyes being closed ; or any thing placed in such a position, that, had her eyes been open, she could not have seen it ; she could also see very often all that passed outside of the door, and when I was there, told us how many of the servants of the hotel were listening at the door, in hopes of hearing wonders ; she would also often tell what was doing in the room above or below her. In short, she frequently exhibited direct clairvoyance in every form, not only in those just mentioned, but also in that of seeing prints or pictures shut up in boxes. Besides seeing various instances of direct clairvoyance, I was able to satisfy myself that Dr. Haddock's experiments were made with the greatest care and judgment ; that he was particularly well acquainted with the various causes of error and confusion, very careful to avoid these, and that in short his accounts of such experiments as I had not seen were entirely trustworthy."

On page 334 in the same work, we read this account of clairvoyance under hypnotism:

"We requested her to visit the house of Mrs. P., one of the ladies present. This house was in Greenock, distant from my cottage about a mile and a quarter. She saw her servant in the kitchen, but said that another woman was with her. On being pressed to look earnestly at the woman, she said it was C_____ M______. This, Mrs. P. declared to be true. We then asked her to see if any person was in Mrs. P.'s parlor, when she said that Miss Laing was there, a young lady from Edinburgh, who was boarding with Mrs. P. at the time ; that she was sitting on the sofa ; that she was crying, and that a letter was in her hand. On the party breaking up, I walked into Greenock with the ladies and gentlemen, in order to see if she was right about Miss L. It was true. Miss L. had received a letter by that evening's post from her father in Edinburgh, stating that her mother was not expected to live, and requesting her to come home by the first train in the morning."

Although living mind researchers have usually displayed an appalling failure to research the topic of clairvoyance under hypnosis that was so well-documented in the nineteenth century, we occasionally get evidence of it even in recent years. A 2020 paper found that hypnosis increased success in remote viewing efforts, remote viewing being essentially a synonym for clairvoyance. Using RV for a non-hypotic "remote viewing" attempts, and OB-RV for a hypnotically aided "remote viewing" attempts, in which subjects were encouraged to mentally travel out of their bodies, the paper states the following:

"The purpose of this study was to compare the ability to identify and describe physical targets, from a distance, in the RV and OB-RV states of consciousness.The results clearly demonstrate that in both conditions, the amount of correct information is clearly greater than wrong information, with a difference of around 20%. The only difference in performance between the two is in the number of correct information, which is slightly greater in the OB-RV condition."

The author Joseph Haddock reported that after hypnotizing a subject, the subject would respond to any pain inflicted on Joseph, just as if the hypnotized person had felt the pain: "I have got individuals to tread on my toes, pull my hair, or pinch different parts of the body ; and I invariably found that, with this subject, not many seconds would elapse before she would complain of exactly similar treatment, and refer the pain to the exact corresponding part; and sometimes I have experienced considerable difficulty in dispelling the illusion."

An effect totally inexplicable under materialist assumptions is what is called "community of sensations" under hypnosis. It has been very frequently reported that a hypnotized person may instantly feel sensations felt by the person who hypnotized him. A set of experiments on this effect is reported in the "First Report of the Committee on Mesmerism" pages 225-229 of Volume 1 of the Proceedings of the Society for Psychical Research (April, 1883), a committee including the illustrious names of Frederic Myers, Edmund Gurney, Frank Podmore, George Wyld M.D. and the eventually knighted physicist W.F. Barrett. We read this on page 226: "Thus out of a total of 24 experiments in transference of pains, the exact spot.was correctly indicated by the subject no less than 20 times." These were experiments in which the hypnotized subject was asked whether he felt anything, after the hypnotizer had been given some type of pain or sensation while in another room where the hypnotized person could not see him. Similar results were obtained by Dr. Edmund Gurney and reported in his paper "An Account of Some Experiments in Mesmerism," published on page 201 of Volume II of the Proceedings of the Society for Psychical Research (June 1884). As reported on page 205, a hypnotized subject identified with high accuracy many tactile and taste sensations occurring in a hypnotizer sitting behind him.

In a discussion of twentieth century research we read this:

"Summarizing the results of recent ESP research using hypnosis, Honorton points out that, out of 42 series of trials, slightly over half have provided positive results, as against a chance expectation of five per cent. 'I believe the conclusion is now inescapable that hypnotic induction procedure enhance psi receptivity.' "

Phenomenon #5: extreme suggestibility.

An astonishing aspect of hypnotism is that hypnotized people will seem to act or believe in various ridiculous ways, if the person hypnotizing them has suggested the action or belief. A nineteenth century work describes this aspect of hypnotism, describing some hypnotized subjects:

"*When they drank water, and were told that it was milk, coffee, rum, whisky, or wormwood, they tasted it as such. Nay, after drinking it as whisky, they were told that they were drunk, and in a minute or two became, in every particular, very drunk indeed. The expression of the face was perfectly that of intoxication, and they could not walk a step without staggering or falling. They were easily made, by suggestion, to fancy themselves any other persons, and acted in character. They shot, fished, swam, lectured, and exhibited every feeling suggested to them. They were as easily made to suppose a stick to be a gun, a rod, a sword, nay, a serpent ; or a chair to be a tiger or a bear. From these animals they fled with extreme terror. They were made to see, hear, and feel a dreadful storm, and to creep for shelter under a table or a chair, supposed by them to be a house. From this, they were soon expelled by the serpent, or by the flood rising, when they swam lustily for their lives. This was the first time that either of them had been tried ; and the control exercised by Mr. Lewis over their sensations, erceptions, and emotions was perfect, although their consciousness was entire. They knew the suggested impressions to be false, but could not resist them. It was most interesting to watch closely their countenances, when an object, for example, a handkerchief, was placed in the hand, and, after they felt quite sure of what it was, they were told it was a rat, &c. The gradual change to doubt, from doubt to certainty, and from that to disgust or anger, was inimitable, and conveyed at once, to those near enough to see it, complete conviction of their sincerity."*

Later in the same book we have an account of a person becoming extremely suggestible under hypnosis:

"His muscular motions were controlled in every possible way. He was rendered unable to raise his hands, or to let them fall ; he was made unable

to move one, while he could move the other ; unable to sit down or to rise up ; or to take hold of, or let go an object. One arm was deprived of sensation, or both arms, or the whole frame. He was made to feel a knife burning hot, and the chair on which
he sat equally so. When he started up, he was made to feel the floor so hot that he was compelled to hop about, and wished to pull off his boots, which burnt him. He was made to feel the room intolerably warm, and actually perspired with the heat ; after which he was made to feel it so cold, that in a minute or two he buttoned his coat, and walked about rubbing his hands. In about five minutes his hand was really chilled, as I found, like that of a person exposed to frost. He was made to forget his own name, as well as that of Col. Gore Browne, who was present, and to imagine Col. B. a total stranger. He was compelled, for a time, to give a false answer to every question asked ; and then was forced to give true answers to every question, in spite of any effort he might make to do otherwise. He was told he was on duty, at drill ; and began to give the word of command, as if in the barrack-yard. He was compelled to sing and whistle, in spite of himself; to laugh immoderately, and then to feel sad, and even to weep, all in spite of his own will. He was told that a stick was a gun, and with it, he shot and bagged a grouse, which he was made to see before him. He was told the piano-forte was a horse, and after feeling and closely examining it, he specified its points and defects, and appraised its value. He tasted water precisely as was suggested to him, as lemonade, tea, or wormwood. He was told that Dr. D.'s hand was a mirror, and in it he saw himself with a black face, as Dr. D. told him to do. He was made to look at his watch, and then convinced that it pointed to a different hour from the true one. He was then made to believe the watch to be a daguerreotype of Col. Browne, and again of a lady. Dr. D.'s empty hand became a snuff-box, from which he took a pinch, which made him sneeze violently, and this passed into a most severe cough, as if he had inhaled snuff, which sensation was not removed for
about half-an-hour. He was made to go to sleep in one minute, and in his sleep to be deaf to the loudest sounds."

There follows in the book a description of quite a few cases of similar levels of suggestibility under hypnosis.

Phenomenon #6: post-hypnotic suggestions.

An astonishing aspect of hypnotism is that people in a hypnotic trance who have promised to do something or been instructed to do something will often do just such a thing, even if they have no memory of promising such a thing or being told to do such a thing when they were hypnotized. A nineteenth century work describes this tendency, using the word "sleeper" for a hypnotized person:

"This leads me to another very curious phenomenon, namely, that the sleeper, if commanded, in the sleep, to do a certain thing, after waking, and at a certain hour, will do so, and however absurd or ridiculous the act, he cannot, in many cases, refrain from doing it, if he has promised it in the sleep."

Phenomenon #7: transposition of senses.

Another astonishing aspect of hypnotism is that people in a hypnotic trance sometimes reportedly have a kind of displacement of one or more of the senses. For example, they may be able to see only things presented to some part of their body other than their eyes. A nineteenth century work describes this on page 148:

"I have not hitherto noticed, save in passing, a phenomenon which occasionally presents itself, but which is not by any means uniformly present in a marked form; I mean, transference of the senses to some special part of the body.... But it sometimes happens, that the power of seeing, not the ordinary sense of sight, but the clairvoyant power, is located in some special part. It has been observed to be located in the pit of the stomach, in the tips of the fingers, in the occiput as well as in the forehead, or on the top of the head, and in one case which I heard of from a scientific gentleman who tested it, in the soles of the feet. The books and journals which treat of Animal Magnetism teem with similar facts; and the head, hand, and epigastrium, seem to be the usually selected parts, probably from the proximity to the brain in the first, the great development of the nerves of touch in the second, and the presence of the great sympathetic plexus of nerves in the third. The fact itself is beyond all doubt, and it is quite unnecessary to accumulate cases. In one form or other, the power of dispensing with the eyes, and yet perceiving color, &c. quite plainly, is found in every good subject. The same thing frequently happens with hearing. Thus E. when on her travelling state or stage, is utterly deaf to all sounds, save those which are addressed to her by speaking with the mouth in contact with the tips of her fingers. This fact I have myself verified. I believe she would not hear a pistol fired at her ear, in that state."

Phenomenon #8: astonishing time-keeping or time calculation abilities.

In the long Chapter 1 of the 1922 book "Medical Psychology and Psychical Research" by T. W. Mitchell there is a long discussion of astonishing time-keeping abilities of hypnotized subjects. Mitchell performed many experiments in which a subject under hypnosis was told to perform a simple task (to draw a cross on a piece of paper) after a particular interval of time expired. The subject would be brought out of the hypnotic state long before the interval expired.

On page 12 Mitchell mentions an example of time-keeping seeming to occur with such post-hypnotic suggestions, starting with a January 3 post-hypnotic suggestion:

"On January 3rd, 1907, I made a similar suggestion to be fulfilled on 'the I45th day from this.' On January 16th I asked her in hypnosis if she remembered what I told her on January 3rd. She said she did. ' How many days are gone ?' '13.' ' How many to come ?' ' 132.' ' When does it fall due ?' 'May 28th.' All the answers are correct, and were given without any hesitation. On being asked the same questions on January 29th, she said that 26 days had passed, and 119 still to come (right)."

On page 18 we read this:

"Here is an example of Delboeuf's experiments. At 6.55 a.m. he suggested to his subject M. that at the expiration of 1,500 minutes she was to ask Madame Delboeuf if she required anything. This suggestion was carried out with absolute accuracy. Delboeuf made twelve experiments of this kind, the time-intervals suggested varying

from 350 to 3,300 minutes. Two of these were fulfilled at the moment they fell due. In three the impulse to fulfil the suggested act arose at the right time."

What we see here is a time-tracking ability (in post-hypnotic suggestions) greater than any ability humans in normal consciousness. If you asked a person in normal consciousness to do something (such as jumping in the air) after the expiration of 1500 minutes, he would be most unlikely to do the requested thing at the exact time (without the use of something like an alarm clock).

On page 15 we have this example obtained by a Dr. Bramwell (whose book on the topic you can read here):

"On Tuesday, December 24th, 1895, at 3.10 p.m., Miss D. was told, during hypnosis, that she was to make a cross on a piece of paper in 7,200 minutes (Exp. No. 7). This fell due to be fulfilled on Sunday, December 29th. When it was fulfilled Miss D. was teaching a Sunday School class, when she suddenly felt an impulse to make a cross and mark the time. It was only after doing so that she looked at the clock, which was behind her. Her estimation of the time was correct."

The next page tells us that 45 similar experiments with Miss D. produced similar results: "Forty-five were completely successful, i.e. not only did Miss D. write down the correct terminal time, but this was done, also, at the moment the experiment fell due." On the same page Mitchell tell us, "I have made a series of observations which corroborate in many ways the results obtained by Dr. Bramwell."

On page 19 Mitchell gives us exact results from experiments in post-hypnotic suggestion he did with a subject F.D. The astonishingly accurate results are shown below. For example, in the first experiment, the subject F. D. was told under hypnosis to do some specific thing (such as draw a cross) 700 minutes into the future, and the subject did that exactly that thing 700 minutes later.

Interval suggested.	Suggestion due.	Suggestion fulfilled.
700 min.	Mar. 31, 11.10 p.m.	Mar. 31, 11.10 p.m.
4,000 min.	April 6, 5.40 a.m.	April 6, 5.40 a.m.
2,885 min.	April 11, 4.5 p.m.	April 11, 4.5 p.m.
3,090 min.	April 14, 3.30 p.m.	(Calculation only wanted.)
7,410 min.	(Calculation	only.)
17,505 min.	April 27, 3.45 p.m.	April 27, 3.40 p.m.
4,305 min.	April 24, 4 p.m.	April 24, 4 p.m.
2,880 min.	April 27, 4 p.m.	April 27, 4 p.m.
1,710 min.	April 27, 3.30 p.m.	April 27, 3.30 p.m.
40,360 min.	May 27, 12 noon.	May 27, 12 noon.
40,630 min.	May 27, 4.30 p.m.	May 27, 3.10 p.m.
10,080 min.	May 8, 12 noon.	May 8, 12 noon.
14,350 min.	May 13, 3.10 p.m.	May 13, 3.10 p.m.
9,275 min.	May 10, 3.5 a.m.	May 10, 3.5 a.m.
3,090 min.	May 8, 3.30 p.m.	May 8, 3.30 p.m.
42,312 min.	June 7, 1.12 a.m.	June 7, 1.12 a.m.
184,620 min.	Sept. 13, 9 p.m.	Sept. 13, 9 p.m.
87,145 min.	August 5, 12.25 a.m.	August 5, 12.25 a.m.
214,895 min.	Nov. 1, 5.35 p.m.	Nov. 1, 5.35 p.m.
26,385 min.	July 2, 12 midnight.	(Calculation only.)
3,762 min.	June 20, 2.57 a.m.	June 20, 2.57 a.m.
135 min.	June 23, 3.25 p.m.	June 23, 3.22 p.m.
7,200 min.	June 29, 12.25 p.m.	June 29, 12.25 p.m.
2,935 min.	July 3, 4.54 p.m.	July 3, 4.55 p.m.
8,935 min.	July 7, 8.54 p.m.	July 7, 8.55 p.m.
1,705 min.	July 9, 4.27 p.m.	July 9, 4.30 p.m.
3,145 min.	July 10, 4.35 p.m.	July 10, 4.35 p.m.
4,580 min.	July 19, 4.50 p.m.	July 19, 4.40 p.m.
7,460 min.	July 21, 5.20 p.m.	July 21, 5.20 p.m.
274,800 seconds	July 25, 4.40 p.m.	July 25, 4.40 p.m.

Phenomenon #9: mysterious cures

During the nineteenth century there were very many reports of people being mysteriously cured by hypnotic treatment. To find such reports, you can go to www.archive.org and search for "Mesmerism" and "animal magnetism" (the terms used for hypnosis treatments before the word "hypnosis" overtook them). Many examples can be found in the book *Vital magnetism: its power over disease* by Frederick T. Parson.

A modern scientific paper ("Improving working memory performance in brain-injured patients using hypnotic suggestion") states the following:

"Working memory impairment is prevalent in brain injured patients across lesion aetiologies and severities. Unfortunately, rehabilitation efforts for this impairment have hitherto yielded small or no effects. Here we show in a randomized actively controlled trial that working memory performance can be effectively restored by suggesting to hypnotized patients that they have regained their pre-injury level of working memory functioning."

The paper testing 49 brain-damaged subjects reports a dramatic improvement in working memory for the subjects. Group 1 with 27 subjects improved from an average score of 81.74 (well below average) to an average score of 107.44 (well above average). Group 2 with 22 subjects improved from an average score of 80.36 (well below average) to an average score of 103.95 (substantially above average).

A psychology paper reports that after a brain-damaged woman was hypnotized and told that she could fix her cognitive problems, she "had major improvements in the cognitive tests," and "her Working Memory Index improved from the 0.17 % percentile to the 10% percentile."

See here for a wide variety of medical improvements produced by hypnosis.

Phenomenon #10: exaltation of thinking and speaking abilities or memory ability

It has often been reported that in a hypnotic trance someone might be able to think and speak much better than he could in his normal consciousness. An example of such a thing is given in the book *The Mechanism of Man: An Answer to the Question, what Am I?* by Edward William Cox. On page 301 we read this:

"But the Trance patient does what the Somnambule does not....He maintains a conversation, answer- ing questions with astonishing ability and in language such as he cannot command in his waking state. Often he will argue with scholastic skill, treating with ease and accuracy subjects of profound thought, far beyond the range of his waking iutelligence. I have heard an uneducated barman, when in a state of Trance, maintain a dialogue with a party of philosophers on 'reason and foreknowledge. Will and fate,' and hold his own against them. I have put to him the most difficult questions in Psychology and received answers, always thoughtful, often full of wisdom, and invariably conveyed in choice and eloquent language. Nevertheless, in a quarter of an hour afterwards, when wakened from the Trance, he was unable to answer the simplest query on a philosophical subject and was not merely inapt at the language of science he had been lately using so glibly, but at a loss for sufficient language in which to express a common- place idea."

We read the following astonishing account in a scholarly work on hypnotism:

"In the first experiment a subject was ordered to solve under hypnosis a geometrical problem, well above his normal ability. The order was carried out, and in precisely the specified time. In another experiment Feldman read to the subject (under hypnosis) several strophes from the lliad (in Greek hexameter) ; the subject repeated them afterwards without a single mistake in words or metre although not knowing Greek. Then half a page was read from a French book. The subject repeated it without mistake. In a third experiment Feldman gave to his subject a difficult trigonometric problem which the latter tried to solve for several hours without success. Under hypnosis he solved it with remarkable ease, using a different formula, tackling logarithms without hesitation, etc. After waking up he was again unable to solve the same problem (Rebus, 1885, No. 41, PP. 370-371). Feldman observed that along with the increase of such faculties as memory and mathematical ability his subjects experienced peculiar changes of eyesight. Thus, for example, a certain Mr. T., normally near-sighted, in hypnosis would become exceedingly far- sighted."

A Russian scholar of hypnotism describes stages of hypnotic trances, and we can only wonder what observations led him to make the remarkable claim mentioned at the end of this passage:

"The second [stage], when the sensitivity was partly suspended was magnetic half-sleep. In the third stage, magnetic sleep occurred when all external sensations and all contact with the outside world were stopped. In the fourth stage the magnetized person depended entirely upon his magnetizer who acted as an intermediary, capable of producing in his subject sensations, feelings and actions; this was a somnambulist state. In the fifth stage the patient could see clearly the inner mechanism of his body, the cause of his illness and the means to cure it; this was called clairvoyance. During the sixth stage the subject entered into a superior state, the union with the whole of nature, whereby he became able to understand all phenomena, and was not limited by time and space ; this stage was called secret illumination and the phenomena of ' stepping out of the body' could then occur."

The lack of any workable neuroscience theory to explain hypnotic phenemena

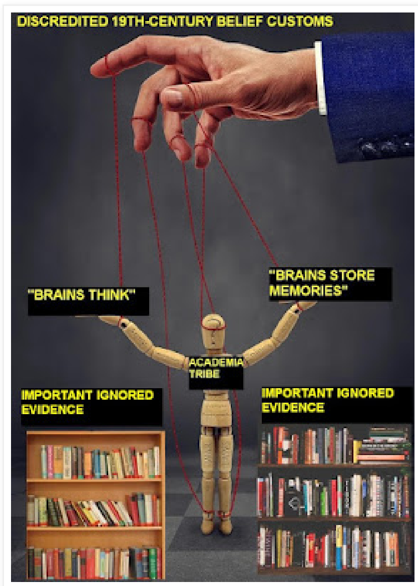
It is impossible to explain the more anomalous aspects of hypnotism under the prevailing dogmas that the brain is the cause of human mental phenomena and the storage place of memories. When neuroscientists attempt to offer an explain for hypnotism, they usually use the trick of mentioning only a small subset of the phenomena that have been observed in hypnotic trances.

Near the end of his book *Hypnotism and Treatment by Suggestion*, Bramwell commented on the lack of any good theory to explain what occurs under hypnotic trances. He stated this:

"So far, no reasonable answer has been given to the question, 'What is the connection between hypnotic methods and the production of so-called hypnotic phenomena ?' Personally, I see no logical connection between the acts of fixed gazing, concentration of attention, suggested ideas of drowsy states, and the varied manifestations of so-called hypnosis."

After disputing some theories trying to explain hypnotism, the author states, "While I have raised objections to all the theories referred to — theories which are discussed much more fully in my larger work -- I have unfortunately, no theory of my own to bring forward in substitution for them." Bramwell had no theory because he was man of a materialist bent.

Once we discard materialist ideas about the brain, we may start to put forth some ideas that can begin to explain some of the mysteries of hypnotism. One idea is that the brain is not the cause of our minds, but mainly a kind of valve that limits our minds. If so, then something fairly simple such as hypnotism might reduce that valve effect. The result might be an abundance of mental phenomena inexplicable through any neural cause, not phenomena that are produced by the brain, but powers and aspects of a human soul that a normal brain blocked us from previously seeing, through a valve effect rather like how a valve prevents water from flowing.



at January 02, 2021 No comments:

Labels: ESP, hypnosis

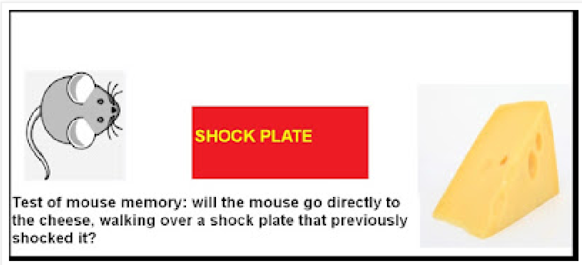
Tuesday, December 22, 2020

Neuroscience Research Customs Guarantee an Abundance of Junk Science

There is a very great deal of junk science published by neuroscientists, along with much research that is sound. That so much junk science would appear is not surprising at all, given the research customs that prevail among neuroscientists.

Let us look at a hypothetical example of the type of junk science that so often appears. Let us imagine a scientist named Jack who wishes to show that a particular protein in the brain (let's call it the XYZ protein) is essential for memory. We can imagine Jack doing a series of experiments, each one taking one week of his time.

Jack thinks up a simple design for this experiment. Some mice will be genetically engineered so that they do not have the XYZ protein. Then the mice will be given a memory test. First, the mice will be placed in a cage, with a shock plate between the mouse and the cheese. When the mouse walks over the shock plate to go directly to the cheese, the mouse will be shocked. Later the mouse will be placed in the cage again. It will be recorded whether the mouse takes an indirect path to get the cheese (as if it remembered the previous shock it got on the shock plate), or whether the mouse just goes directly to the cheese (as if it did not remember the previous shock it got on the shock plate). The visual below shows the experiment:



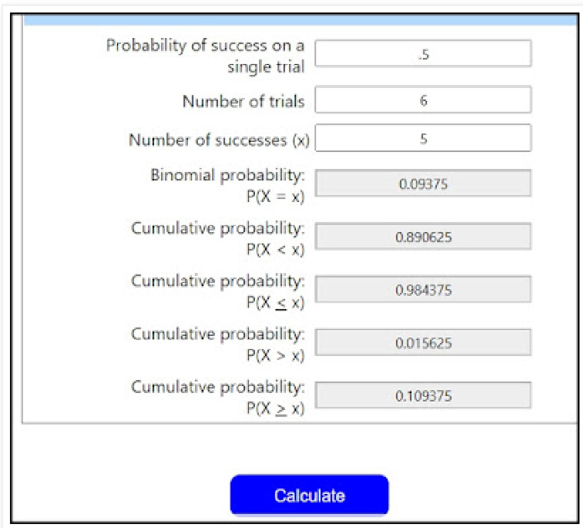
Now, let us imagine that on Week 1 Jack does this experiment with 6 mice, and finds no difference between the behavior of the mice that had the XYZ protein, and those who do not. Jack may then write up these results as "Experiment #1," file the results in a folder marked "Experiment #1", and keep testing until he gets the results he is looking for.

Jack may then get some results such as the following:

Week 2: Mice without XYZ protein behave like those with it. Results filed as Experiment #2.
Week 3: Mice without XYZ protein behave like those with it. Results filed as Experiment #3.
Week 4: Mice without XYZ protein behave like those with it. Results filed as Experiment #4.
Week 5: Mice without XYZ protein behave like those with it. Results filed as Experiment #5.
Week 6: Mice without XYZ protein behave like those with it. Results filed as Experiment #6.
Week 7: Mice without XYZ protein behave like those with it. Results filed as Experiment #7.
Week 8: Mice without XYZ protein behave like those with it. Results filed as Experiment #8.
Week 9: Mice without XYZ protein behave like those with it. Results filed as Experiment #9.
Week 10: Mice without XYZ protein behave like those with it. Results filed as Experiment #10.
Week 11: Mice without XYZ protein behave like those with it. Results filed as Experiment #11.
Week 12: Mice without XYZ protein behave like those with it. Results filed as Experiment #12.
Week 13: Mice without XYZ protein behave like those with it. Results filed as Experiment #13.
Week 14: Mice without XYZ protein behave like those with it. Results filed as Experiment #14.
Week 15: Mice without XYZ protein behave like those with it. Results filed as Experiment #15.
Week 16: Mice without XYZ protein behave like those with it. Results filed as Experiment #16.

Then finally on Week 17, Jack may get the experimental result he was hoping for. On this week it may be that 5 out of 6 mice with the XYZ protein avoided the shock plate as if they were remembering well, but only 3 out of 6 mice without the XYZ protein avoided the shock plate as if they were remembering well. Is this evidence that the XYZ protein is needed for memory, or that removing it hurts memory? The result on Week 17 is no such thing. This is because Jack would expect to get such a result by chance, given his 17 weeks of experimentation.

We can use a binomial probability calculator (like the one at the Stat Trek site) to compute the probability of getting by chance 5 (or 6) out of 6 mice avoiding the shock plate, under the assumption that there was always 1 chance in 2 that a mouse would avoid the shock plate. The calculator tells us the chance of this is about 10 percent per experiment:



Since Jack has done this experiment 17 times, and since the chance of getting 5 out of 6 mice avoiding the shock plate by chance is about 10 percent, Jack should expect that at least one of these experiments would give the results he has got, even if the XYZ protein has nothing at all to do with memory.

But there is nothing in the research customs of neuroscience to prevent Jack from doing something that will give readers a wrong impression. Instead of doing a paper writing up all 17 weeks of his experimentation, Jack can produce a paper that writes up only week 17 of his research. The paper can then have a title such as "Memory is weakened when the XYZ protein is removed." We can imagine research standards that would prevent so misleading a paper, but such standards are not in place. Discussing only Week 17 of his research, Jack can claim to have reached a "statistically significant" result providing evidence that the XYZ protein plays a role in memory.

Two other customs aid very much accumulation of junk science:
(1) It is not customary in scientific papers to report the exact dates when data was collected. This makes it much harder to track down any cases in which an experimenter reports an experimental success during one data-gathering session, and fails to report failures in such experiments during other data gathering sessions.
(2) It is not customary in scientific papers to report the person who made a particular measurement or produced a particular statistical analysis or a particular graph. So we have no idea of how many hard-to-do-right scientific

measurements (using very fancy equipment) were done by scientists-in-training (typically unnamed as paper authors) or by novice scientists who may have committed errors. And we have no idea of how many hard-to-do-right data analysis graphs were done by scientists-in-training or by novice scientists who may have committed errors.

Instead of such customs, it is a custom to always vaguely use a passive voice in experimenatal papers. So instead of a paper saying something like, "William Smith measured the XYZ protein levels in the five mice on January 3, 2020," our neuroscience papers are filled with statements such as "XYZ protein levels were measured in five mice" that fail to mention the person doing the measurement or when the measurement was done.

What kind of research customs would help prevent us from being misled by experimental papers so often? We can imagine some customs:

(1) There might be a custom for every research scientist to keep an online log of his research activities. Such a log would not only report what the scientist found on each day, but also what the scientist was looking for on any particular day. So whenever a scientist reported some experimental effect observed only on week 27 of a particular year, we could look at his log, and see whether he had unsuccessfully looked for such an effect in experiments on the five preceding weeks. Daily log reports would be made through some online software that did not allow the editing of reports on days after the report was submitted.
(2) There might be a custom that whenever a scientist reported some effect in a paper, he would be expected to fully report on each and every relevant experiment he had previously done that failed to find such an effect. So, for example, it would be a customary obligation for a scientist to make reports such as this whenver there were previous failures: "I may note that while this paper reports a statistically significant effect observed in data collected between June 1 and June 7, 2020, the same experimenter tried similar experiments on five previous weeks and did not find statistically significant effects during those weeks."
(3) It would be the custom to always report in a scientific paper the exact date when data was collected, so that the claims in scientific papers could be cross-checked with the online activity logs of research scientists.
(4) It would be the custom to always report in a scientific paper the exact person who made any measurement, and always report the exact person who made any statistical analysis or produced any graph, so that people could find cases when hard-to-do-right measurement and hard-to-get-right analysis was done by scientists-in-training and novice scientists.
(5) It would be a custom for studies to pre-register a hypothesis, a research plan and a data analysis plan, before any data was collected, which would help prevent scientists from being free to "slice and dice" data 100 different ways, looking for some "statistically significant" effect in twenty different places, a type of method that has a high chance of producing false alarms.
(6) It would be a custom for any scientific paper to quote the pre-registration statement that had been published online before any data was collected, so that people could compare such a statement with how the paper collected and analyzed data, and whether the effect reported matched the hypothesis that was supposed to be tested.
(7) Whenever any type of complex or subtle measurment was done, it would be a custom for a paper to tell us exactly what equipment was used, and exactly where the measurement was made (such as the electron microscope in

Room 237 of the Jenkins Building of the Carter Science Center). This would allow identifications of measurements made through old or "bleeding edge" or poorly performing or unreliable equipment.
(8) Government funding for experimental neuroscience research would be solely or almost entirely given to pre-registered "guaranteed publication" studies, that would be guaranteed journal publication regardless of whether they produced null results, which would reduce the current "publication bias" effect by which null results are typically excluded from publication.
(9) Government funding would be denied to experimental neuroscience research that failed to meet standards for minimum study group sizes, greatly reducing all the "way-too-small-sample-size" studies. Journals would either deny publication to such "way-too-small-sample-size" studies or prominently flag them when they used such way-too-small study groups.

No such customs exist. Instead we have poor neuroscience research customs that guarantee an abundant yearly supply of shoddy papers.

Postscript: My discussion above is largely a discussion of what is called a file-drawer effect, in which wrong ideas arise because of a publication bias in which scientists write up only experiments that seem to show signs of an effect, leaving in their file drawers experiments that did not find such an effect. A paper discusses how this file drawer effect can lead to false beliefs among scientists:

"Many of these concerns stem from a troublesome publication bias in which papers that reject the null hypothesis are accepted for publication at a much higher rate than those that do not. Demonstrating this effect, Sterling analyzed 362 papers published in major psychology journals between 1955 and 1956, noting that 97.3% of papers that used NHST rejected the null hypothesis. The high publication rates for papers that reject the null hypothesis contributes to a file drawer effect in which papers that fail to reject the null go unpublished because they are not written up, written up but not submitted, or submitted and rejected. Publication bias and the file drawer effect combine to propagate the dissemination and maintenance of false knowledge: through the file drawer effect, correct findings of no effect are unpublished and hidden from view; and through publication bias, a single incorrect chance finding (a 1:20 chance at α = .05, if the null hypothesis is true) can be published and become part of a discipline's wrong knowledge."

We can see how this may come into play with neuroscience research. For example, 19 out of 20 experiments may show no evidence of any increased brain activity during some act such as recall, thinking or recognition. Because of the file drawer effect and publication bias, we may learn only of the one study out of twenty that seemed to show such an effect, because of some weak correlation we would expect to get by chance in one out of twenty studies.

A web site describing the reproducibiity crisis in science mentions a person who was told of a neuroscience lab "where the standard operating mode was to run a permutation analysis by iteratively excluding data points to find the most significant result," and quotes that person saying that there was little difference between such an approach and just making up data out of thin air.

at December 22, 2020 No comments:

Head Truth

The huge case for thinking minds do not come from brains

Tuesday, December 15, 2020

They Kept Torturing the Data Until It Confessed to "Time Cells"

Behold the power of the modern neuroscientist. Like a magician making you believe in something that did not really happen, a neuroscientist can make you believe in something that's not really there. Part of the trick is to just use loaded language to describe particular cells. So if a neuroscientist wants you to believe that some cells store memories, he can just start calling any arbitrary cells he has selected "engram cells." And if a neuroscientist wants you to believe that some cells have something to do with time-related episodic memories, he can just arbitrarily pick some cells and start calling such cells "time cells." And if the neuroscientist wants to suggest that some cells store information about some place, he can just arbitrarily pick some cells and start calling such cells "place cells." There are no generally agreed upon standards for identifying some cell as an engram cell or a "time cell" or a "place cell." A neuroscientist can make up any criteria he wishes for identifying some cell as an engram cell or a "time cell" or a "place cell."

Let us look at one of the studies claiming to supply evidence for so-called "time cells." The study is entitled, "Time cells in the human hippocampus and entorhinal cortex support episodic memory." At the very beginning of the paper we have a definition of time cells designed to make sure they will be found: "Time cells are neurons in the hippocampus and entorhinal cortex that fire at specific moments within a cognitive task or experience." It is well known that neurons are constantly firing. The page here (entitled "Neuron Firing Rates in Humans") states, "we expect average firing rates across the brain to be around 0.29 per second," meaning an average neuron would fire several times each second. So if you have defined time cells as cells that "fire at specific moments within a cognitive task or experience," of course you will be able to find such cells, since neurons are constantly firing. But in the next paragraph the text describes time cells as cells that "encode temporal information." Of course, that's an entirely different definition. The switch in definition does not inspire our confidence.

The scientists describe below just a little bit of their convoluted and wildly unnatural method for trying to detect time cells:

"To identify time cells, we looked for an interaction between time and firing rate using a nonparametric ANOVA across time bins (Kruskal–Wallis test) after generating session-wide firing rate tuning curves with Gaussian convolution of the spike trains. Significance testing incorporated a permutation procedure, in which we repeated the ANOVA 1,000 times after circularly shuffling the original tuning curve."

Total Pageviews

112,503

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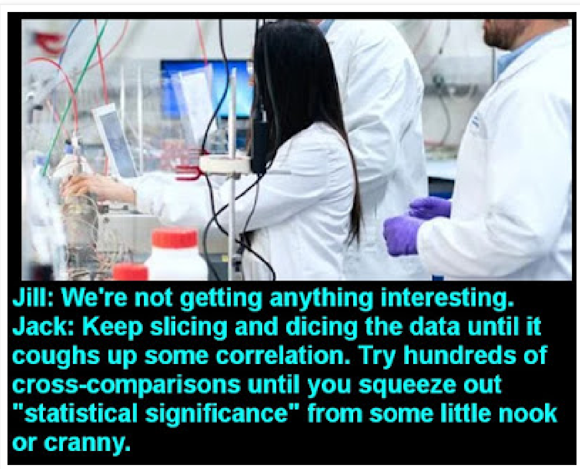
This is not even a full description of the convoluted method the scientists have used to try to gin up some evidence for time cells. When you read the supplementary information of the paper, you will read about many other procedural twists and turns of their Byzantine method. For example, we read this:

"We first down sampled the spike train by a factor of 32 or 30, depending on the original sampling rate. We then compared the fits of two models that describe the likelihood of spiking activity at any given sample along the length of the encoding list (for encoding time cells) or retrieval list (for retrieval time cells)....A time field model, specified by a total of four parameters, included a Gaussian field of increased firing probability located somewhere along the length of the encoding list...The former was bound between 0 and 1, so that the mean of the field was located within the encoding list. To prevent excessively large Gaussian fields appearing as a flat line across the list, the standard deviation was bound at 1/6....We used matlab's particleswarm with fmincon as a hybrid function to minimize the negative log-likelihood of these models to solve for their parameters.... We fit the model to data from all lists, only odd lists, and only even lists to avoid a single list driving the effect."

Reading about this labyrinthine methodology, I'm reminded of a saying commonly stated among experimenters: if you torture the data long enough, it will confess to anything.



Neuroscience experiments often go rather like this

The visual evidence the authors present as evidence for "time cells" are some "spike heat maps," not anything coming directly from any scientific instrument, but some visuals resulting from some convoluted arbitrary fiddling with the data. Such "spike heat maps" don't look impressive at all, and look like what we would get from random data.

There are two things we would like to see in a study such as this, in order to have any faith that it has actually discovered any evidence of cells that "encode temporal information":

(1) **Evidence of pre-registration**. To have some faith that the scientists were not just playing around with data analysis until they found some faint effect they could call evidence of what they wanted to see, we would like to see the paper tell us that the study was a pre-registered study in which the scientists tested only a very specific hypothesis they had previously publicly committed

themselves to testing (before collecting any data), using one and only one method of data gathering and data analysis they had previously publicly committed themselves to (before collecting any data). We can assume the study was not pre-registered, since no claim is made of such a thing.
(2) **Evidence of blinding**. For a study like this to be credible, we would need to see a description of how an exact blinding protocol was followed, to reduce bias in data gathering and data analysis. No mention is made of any blinding protocol.

The study provides no robust evidence at all that there are cells that "encode temporal information."

at December 15, 2020 No comments:

Labels: neuron nicknames

Monday, December 7, 2020

Common Experiences That Show the Untruth of Professorial Memory Claims

Scientists have an "ivory tower" dogma about memory formation that is contradicted by much of human experience. The dogma is that you cannot instantly form a long-term memory. The reason why scientists believe this very silly notion has to do with their groundless theory that memories are stored in brains through the strengthening of synapses. The strengthening of synapses would require the synthesis of new proteins, which requires minutes.

So a neuroscientist will typically claim that you can't instantly acquire a permanent long-term memory, an idea that is sometimes called the theory of consolidation. They will claim that if you learn something just once, or see it just once, it will only exist in short-term memory, and quickly fade away. They will claim that repeated exposures are required of some thing to be learned, and that over the length of these repeated exposures, there will be time for synapses to be strengthened through protein synthesis.

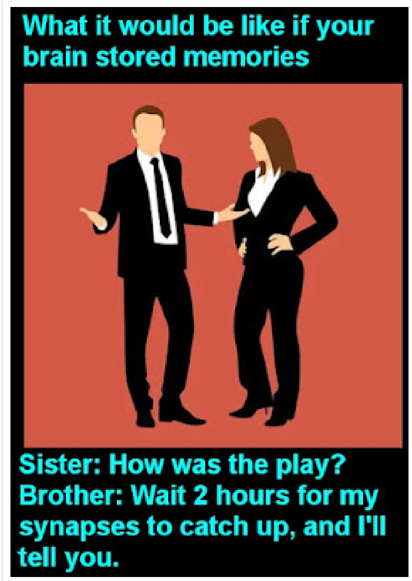
A statement of this theory of memory consolidation appeared recently in an MIT press release, making claims I debunk here. In the press release we read this:

“'The formation and preservation of memory is a very delicate and coordinated event that spreads over hours and days, and might be even months — we don't know for sure,' Marco says. 'During this process, there are a few waves of gene expression and protein synthesis that make the connections between the neurons stronger and faster.' ”

Such a dogma is described like this in a scientific paper, which attributes to "common sense" something that is actually contrary to common sense and common experience:

"Common sense believes that long-term memory (LTM) is difficult to form for it requires repeated efforts for acquiring. The consolidation theory suggests that LTM needs hours to convert labile memory to LTM. This process requires the synthesis of new proteins that supports long-lasting changes in synaptic morphology."

- Exhibit A Suggesting Scientists Don't Understand How a Brain Could Store a Memory
- The Dubious Dogma That Brains Make Decisions
- Long Article Tries to Show Neural Memory Storage, but Gives No Real Evidence for It
- How Evidence for ESP Undermines the “Minds Come From Brains” Dogma
- Gender Differences in Brains Help Discredit Prevailing Dogmas About Brains
- Study Finds Equal Brain Connectivity in All Mammals
- Some Reasons the Main Theory of Neural Memory Storage Is Unbelievable
- Scientists Can't Persuasively Explain How a Brain Could Instantly Retrieve a Memory
- The Lack of Evidence for Memory-Storage Engram Cells
- Candid Confessions of the Cognitive Experts
- Global Workspace Theory Sure Isn't an Explanation for Consciousness
- When Animals Cast Doubt on Dogmas About Brains
- Memories Can Form Many Times Faster Than the Speed of Synapse Strengthening
- The Guy with the Smallest Brain Had the Highest IQ
- He Had Half a Brain and Above Normal Intelligence
- The Truth About Neurons and Synapses
- A Diagram of Explanatory Dysfunction in Academia
- The Brain Shows No Sign of Working Harder During Thinking or Recall
- More Evidence of High Mental Function Despite Large Brain Damage
- The Lack of a Viable Theory of Neural Memory Encoding
- More Evidence That Neuron Loss Has Little Effect on Cognition
- Fraud and Misconduct Are Not Very Rare in Biology
- Reasons for Doubting Thought Comes from the Frontal Lobes or Prefrontal Cortex
- Why Most Animal Memory Experiments Tell Us Nothing About Human Memory
- Other Evidence of Human Paranormal Abilities



I could cite some animal studies that contradict such claims. But there would be no point in doing so, for we do not need any peer-reviewed scientific studies to prove that humans commonly form long-term new memories instantly. There is an abundance of very common human experience that can be cited to prove that humans routinely form new long-term memories instantly.

Let us consider the simple case of a diary writer who has the habit of writing down in his diary before he goes to bed the events of the day. Such a diary writer will have no trouble recalling all the important events that happened during the day, even events that he has not reviewed in his mind after they happened. Under the classification system used by psychologists, memories of things that happened twelve hours ago are long-term memory, and only memories of events within the past few minutes are short-term memory.

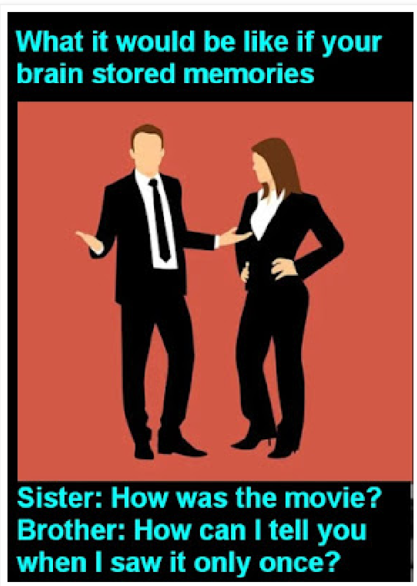
Consider also the case of a store owner. He sees a customer he may have seen a few days ago, only briefly, for the first time. Upon seeing the customer the second time a few days or weeks later, he may say, "Good to see you again." Such a store owner has formed a long-term memory after only a single brief encounter with a person.

It is a fact of human experience that humans can form long-term memories after listening to a teacher describe a historical incident only one time. For example, after you heard your history teacher describe for the first time the assassination of Abraham Lincoln or Julius Caesar or John Kennedy, you probably remembered such stories long enough to pass a test in that class a few days or weeks later; and there is a good chance you remembered such accounts for years. It was not necessary for the teacher to tell the stories two or three times for you to form a long-term memory of them.

An extremely common example of the instant formation of long-term memories is how we remember movies and TV shows we have already seen. Imagine you see a particular movie on television for the first time. If you were paying attention while watching, you will instantly form a long-term memory of the events in that movie. Then a few months or years later you may see the movie showing again on TV, which frequently has repeat showings of movies and TV shows. What will you typically do when you find the TV showing that old movie you saw a few months or years ago? If you particularly enjoyed the movie, you may want to watch it again. But more commonly, you will just change the channel, thinking to yourself, "I've already seen that one."

Why do you do that? It's because you remember the story of the movie, after having seen it only one time. So you change the channel, because you want to see some fresh never-before-seen story rather than some story you remember. This would never happen if the dogmas of neuroscientists were true. If it required minutes for you to synthesize a protein to strengthen synapses in order to form a memory, you would never be able to remember things in a movie at the speed at which a movie or TV show is displayed.

You can do a test to refute claims that it takes many minutes for you to form long-term memories. Five minutes after you finish watching a movie (which is longer than the maximum retention time attributed to short-term memory), ask yourself to orally tell what happened in the movie. You will be able to recount the whole story if you paid attention while watching it. There will not at all be any "catch-up" effect in which you start to remember the movie's story better a half an hour or hours later after your synapses and proteins have caught up in their storage work. This is because you aren't actually storing memories through protein synthesis or synapse strengthening. There is no real evidence for a brain storage of memories. You remember things just as if your brain had no involvement, and you can instantly form a permanent new memory when something important happens. When someone slaps you hard on your face, you will instantly form a vivid permanent new memory. You do not require repeated slaps for you to remember being slapped.



Brain proteins have an average lifetime of less than two weeks. Your brain replaces its proteins at a rate of about 3% per day, and you wouldn't remember things more than a month or two if your brain was storing memories. But people like me have very good memories of trivial things they saw 50 years ago. The other day I was watching an episode of the old "Columbo" TV series from the early 1970's. I correctly identified the full names of an actor and actress that were guest stars, both people I hadn't seen on TV in many years. Then I saw the face of a very little-known actor I haven't seen anywhere in almost 50 years. Very quickly I correctly identified that his first name was John, and that he had played a role in a short-lived TV show canceled in 1971. I quickly remembered the full names of two of the actresses in that short-lived TV show never shown after its cancellation in 1971, and also the name of the show. One of these actresses was one I hadn't seen on TV or in the movies for nearly 50 years. There was no memory consolidation involved in the preservation of such memories, involving persons I haven't seen or recalled in countless years. While watching another "Columbo" episode, I saw Joyce Van Patten, who I remembered as the co-star of some series with Bob Denver, some TV series involving a diner. I hadn't seen the series ("The Good Guys") or read a word about it or thought about it since its cancellation in 1970. No one would have such 50-year memory retention of obscure things if your memories were stored in a brain that replaces its proteins at a rate of 3% per day, and no one would be able to recall such very obscure facts instantly if memories were stored in the brain (something without anything such as indexing allowing fast retrieval).

The idea that repeated exposures are required for permanent memory formation is nonsense contrary to a large-fraction of human experience. The only reason neuroscientists spout this nonsense is that they have committed themselves to some theory of neural memory storage. When I hear a PhD speaking the obvious nonsense that humans require repeated exposures of sensory information to have long-term memories of things, it's one of those times when I say to myself, "It takes a professor to be that blind." Isolated in some ivory tower ideological enclave in which adherence to group belief tenets is regarded as mandatory, a professor may start to believe things that make no sense and are contrary to abundant human experience. He then may end up making some obviously false claim that would never be made by a truck driver or a plumber or anyone else who had not been so conditioned by academia groupthink.

at December 07, 2020 No comments:

Monday, November 30, 2020

A Psychologist's Dubious Generalizations

At an online site we have an interview with a psychologist who has written a book that claims to be teaching lessons about the brain. In the interview we have the usual oracular proclamations by a neuroscientist, without any reference to specific research studies or specific experiments. We are expected to accept such *ex cathedra* declarations, like some Sunday school student is expected to accept whatever dogmas are taught by some minister teaching his class.

The psychologist gets off to an extremely bad start by saying in the first paragraph, "Every thought you have, every emotion you feel, every action you take is ultimately in the service of regulating your body." That statement is quite absurd and untrue. Philosophical thoughts and political thoughts and religious thoughts have nothing to do with regulating your body. The psychologist repeats the same obviously untrue statement later in the interview, by saying, "Everything you think, feel, and do is a consequence of your brain’s central mission to keep you alive and well by managing your body budget." Of course, this is nonsense. When you watch TV or play games or read a novel, such activities are not at all "a consequence of your brain’s central mission to keep you alive and well by managing your body budget."

The rest of the interview just follows the old technique of describing the workings of the mind or will, and describing that as some action of the brain. The psychologist presents no evidence that most of the things described are products of the brain; she just keeps saying your brain does this and your brain does that. Our psychologist makes this claim: "Emotions don’t happen to you

—they are made by your brain as you need them." No, you don't need to feel anger or disappointment when your favorite quarterback throws an interception; and you don't need to feel lust when you see a naked person on your laptop or TV; and you don't need to feel joy when your sports team does well; and you don't need to feel hate when you see someone on TV acting in a revolting manner; and you don't need to feel grief when someone dies; and you don't need to feel wonder when you look at a sky ablaze with stars.

Later our psychologist tells us "your brain doesn't know what's going on in the outside world." That at least is correct, although completely inconsistent with many of the other statements she makes. Your brain does not know about the outside world, and no one has ever discovered knowledge of the outside world by examining neurons. It is only your mind that knows things.

The interview was the usual procession of softball questions we see in interviews with scientists. Just once I would like to see a journalist asking a lot of probing questions when interviewing some authority spouting doubtful claims about the brain. In such an interview, in which a journalist would act like a real journalist, there would be frequent questions like this:

- "Is there any robust evidence for such a claim? If so please explain what that evidence is."
- "So you mention some studies. Were they well-designed pre-registered studies using a good blinding protocol and adequate study group sizes after a sample size calculation was done? Or were such studies the kind of weak research that uses questionable research practices?"
- "On a scale of 1 to 10, in which 1 is pure speculation, and 10 is something directly observed like a moon of Jupiter is directly observed, how strong would you rate the evidence for that claim you just made?"
- "So you say your brain is thinking, but do you really have any understanding of how neurons could produce a thought?"
- "So you say your brain remembers things, but how could a brain remember things that happened 50 years ago, when the brain replaces its proteins at a rate of 3% per day?"
- "Do you really have any understanding of how a brain could translate some learned konwledge into brain states or neural states? If so, explain how that works."
- "Do you really have any understanding of how a brain could instantly remember some knowledge learned many years ago? If so, explain how that works."
- "So if brains do our thinking, how come so many of Lorber's patients had above-average IQ's and brains that were mostly destroyed by disease?"
- "If brains store memories, how come no one has ever found a memory in the brain of a dead person?"
- "So is it your habit to just always say 'the brain does this' when you merely know that a mind or a person does that thing?"
- "Have you studied evidence with conflicts with your claims about the brain, such as evidence for psychic phenomena? If so, what fraction of the 100 main books presenting such evidence did you read?"

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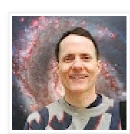

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- "Have you studied neuroscience case histories that seem to conflict with the standard claims about brains, such as people who think and remember well after removal of half a brain? How do you explain such cases?"
- "When you first started thinking that the brain does that thing, was it because some experiment or observation forced you to believe that, or did you just start thinking the brain does that thing because the people at your school thought such a thing?"

at November 30, 2020 No comments:

Friday, November 20, 2020

No One Can Credibly Explain Why a Brain Would Store a Memory in One Specific Spot

The theory of the Christmas activity of Santa Claus is one that very small children will accept, but a theory that a child will discard once he gets a little older. There are too many obvious detects in the theory for a mature mind to hold it: the impossibility of fitting toys for all the world's children in a single sled, the impossibility of such a sled being able to deliver millions of toys on a single night, and the impossibility of Santa Claus getting into so many locked homes. Like the theory of Santa Claus, the theory that brains store memories does not hold up well to scrutiny. Among dozens of good reasons for rejecting the theory, there are:

- the fact that brain proteins have a lifetime of less than two weeks, which is 1000 times shorter than the longest length of time that humans can remember things (60 years or so);
- the fact that no one has any coherent explanation as to how human learned knowledge could ever be translated into neural states or synapse states;
- the fact that humans can form new memories instantly, much faster than the time required for some kind of cellular or synapse modification to occur;
- the fact that no one has ever found any trace of stored information (other than the DNA information in all cells) by studying brain tissue;
- the fact that removing half of someone's brain (as is sometimes done to treat epilepsy patients) has little effect on memory;
- the fact that no one can explain how a brain (without any indexing system and without any position notation system) could ever instantly find the exact spot where some memory was stored in it, which would be like instantly finding a needle in a haystack.

The more we scrutinize the theory that memories are stored in brains, the more problems we become aware of. Let me discuss a problem that was not one of the 30 reasons I previously gave for rejecting the claim that memories are stored in brain, but a different reason. I refer to the problem that no one can give a credible explanation as to why a brain would store a memory in one specific spot in the brain.

Let us consider some examples of information storage, and consider the question: when a piece of information is stored, why is it stored at the specific place that it is stored?

Example of information storage	**Why is the information stored in the specific spot where it is stored?**
Arrival of a new email	All new emails are put at the top of a "stack" of emails
A student taking notes on one day in a class on some subject	The student selects a subject notebook, and writes at the first blank page of the notebook
A person making a diary entry	The person makes the entry in whatever page is marked with a date corresponding to that day's date
You save a new file on your computer	You are provided an interface allowing you to select some folder or directory on your digital device. After you choose a name for the file, the operating system in your computer creates a new file in the specified location, using an operating system routine for selecting empty space in that location.
You buy a book, and take it to your house	You manually select at random an empty space on a bookshelf, and put the book there
You receive an important letter you want to save	You select the appropriate file folder in your file box or file cabinet, and stick the letter in that file folder
You add an item to a "to do list" document you have on your computer	You simply scroll down to the end of your document, and write the new item at the end of the document
You just type some new text in whatever computer document you are currently working on.	Within your document is a blinking cursor that represents the current position, and your newly typed text is added at that position in your document.
You take a new photo with your digital camera.	The digital storage card in your camera is like a stack of photos, and each new photo gets added to the end or beginning of the stack.

So we can see that when information is physically stored, there are specific reasons why particular items of information get stored in specific locations. Let us now consider the human brain, and the theory that a new memory gets stored in some tiny little spot in the brain. Such a theory raises the question: why would a brain store some new memory exactly at that spot, rather than any of 10,000 other little spots in the brain? There are various possibilities you can imagine, but none of them seem to be credible.

One possibility you might imagine is that a brain puts a new memory kind of "at the top of the stack" or "at one end of a chain." Being very imaginative, you can imagine extraterrestrial organisms that might have some kind of stack-like brain or chain-like brain, so that the organism might put each new memory at the top of such a stack or at one end of such a chain. But the human brain bears no resemblance to a chain or a stack. There is no "end writing position" or "first writing position" in the brain to which a brain could write if it were following a "put new information at the end" rule, or "put new information at the beginning" rule.

Another possibilty you might imagine is that a brain might have something like a cursor or a movable write unit that moves from place to place in the brain to write memories at different locations. If the brain had such a thing, we could explain why a brain would store a memory in one specific spot. The explanation would simply be that the writing of a new memory occurs at whatever location the cursor or movable write unit is located. However, the human brain has no such thing as a cursor or movable write unit. There is nothing that moves around in the brain other than electricity and chemicals. We can certainly imagine some strange extraterrrestrial organism with a brain including a movable writing unit having the job of moving around in the brain and writing to different locations, but there is no sign of any such thing in the brain.

You do not get around this difficulty of explaining why storage would occur at some exact location by speculating that there is one tiny brain region (such as the hippocampus) where the brain stores all its new memories. For such a region of the brain would consist of 10,000 smaller sub-regions, and the question would always remain: why was the memory put in one specific spot rather than in any of the other 10,000 spots?

We cannot get around this difficulty by imagining that a brain simply selects a random brain location to write some memory. The selection of one specific random location is something that a human mind or a computer program can do, but there is no evidence that the human body ever subconsciously selects a random location in the body. If you ask me to select a random city in America, I have knowledge of the cities in America and a mind capable of performing such a random selection task. But it would be absurd to maintain that a brain has some kind of subconscious knowledge of some set of possible brain locations where a memory could be written, and some kind of subconscious ability to make a random choice from such a set of locations, choosing subconsciously a random place to write a memory. Nor could we ever explain how a brain (completely lacking in any coordinate system or position location system) could ever cause a memory to be stored exactly in some precise spot that it had randomly selected. Such a thing would be as hard as writing to hay strand #282,035 after your mind had randomly chosen such a

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
- precognition
- predicting intelligence from brains
- prefrontal cortex
- psychiatry
- quantum mechanics
- questionable research practices
- recommended books
- remote viewing
- replication crisis
- savants
- science journalism

hay strand as the place in a huge hay stack where something should be written.

You also do not get around this difficulty by speculating that a brain stores a single new memory in very many separate spots, as that creates a host of difficulties such as how the memory could be divided up into so many different spots, and how the information could be instantly distributed to so many different spots. Then there would be the extremely great difficulty that a memory stored in many different spots would be like scattering each word on a page so that each word was stored in a different spot in your home. Just as such a thing would make it a thousand times harder to instantly retrieve the information on the page, a memory scattered among a thousand different brain places would be vastly harder to retrieve, making it all the more harder to explain how humans are able to instantly retrieve a memory. Moreover, if we imagine a thousand different storage locations for a single memory, then we simply have the original problem a thousand times worse; for the question would be: why were those thousand locations chosen rather than any of a million other possibilities for the thousand places to store the memory?

There is no credible theory of how a neurally stored memory would end up in one specific spot in the brain, rather than any of a thousand other little spots in the brain. What I have discussed here is only one of very many reasons why the idea of a neural storage of memories is untenable.

Let us consider a case in which a memory arises, and what neuroscientists would need to explain under the theory that memories are stored in brains. Let's imagine a case in which a 13-year-old boy is scared very bad when someone sticks a gun in his mouth. The boy grows into a man who remembers this event for 70 years; and whenever he sees a hand gun (even guns with a different color or caliber), he instantly thinks of that moment when someone placed a gun in his mouth. Here are the things that would need to be explained under the theory that memories are stored in brains.

- How a brain could instantly form a permanent memory (for such a memory would appear instantaneously as soon as this traumatic event occurred), at a speed many times faster than the minutes required for some protein synthesis needed for synapse strengthening or synapse modification.
- How a brain could translate into neural states or synapse states this sensory experience of having a gun placed in your mouth.
- How a brain could somehow select some location (among countless thousands of brain spots) for this memory to be stored.
- How a brain could somehow find such a location inside a brain that has no coordinate system and no position notation system, so that the memory could be stored in such a location.
- How a brain could instantly retrieve this memory whenever the boy saw a gun, which would be like instantly finding a needle in a haystack, given a brain with no coordinate system and no position notation system.
- Why such a memory could be retrieved by a brain, even when the person saw guns of a different color and caliber than the gun that was inserted in his mouth.
- How this neural memory trace would somehow be translated into a recollection briefly active in the person's mind after he saw a gun years later.

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

- How this memory could ever be accurately stored and accurately recalled (with a transmission across innumerable synapses) in a brain with so much signal noise that each time a signal passes across a synapse, it is transmitted with a reliability of less than 50%.
- How this memory could be preserved for 70 years, in a brain consisting of proteins with such short lifetimes (two weeks or less) that 3% of the brain's proteins are replaced every day.

To explain this case of the boy instantly forming this memory in a brain and remembering it for 70 years, neuroscientists would need to explain all of these things. Neuroscientists cannot even give a credible explanation for any one of these things.

at November 20, 2020 1 comment:

Labels: memory storage

Sunday, November 8, 2020

Preprint Server Counts Suggest Engrams Are Not Really Science

The arXiv science paper server at https://arxiv.org/ is a widely used resource for finding and reading scientific papers. On its home page we read, "arXiv is a free distribution service and an open-access archive for 1,780,158 scholarly articles in the fields of physics, mathematics, computer science, quantitative biology, quantitative finance, statistics, electrical engineering and systems science, and economics." It has become something of a custom for physicists to upload "preprints" of physics papers to this server. Although mainly associated with physics papers, the server also has a huge number of quantitative biology papers.

An interesting way to use the arXiv server is simply to search for a topic, and see how high the paper count is (in other words, how many papers the server has on a particular topic). Such a method gives a rough idea of how much work has been done on a particular topic. It is not at all true that you can prove something is really science by doing a search for some topic and getting a high paper count. For example, when I search for papers with the word "string" in the title, on October 23, 2020, I get a count of 12,766 papers, a large fraction of which are papers expounding versions of string theory. But string theory is a speculative edifice that is not at all "science with a capital S," and has no observational basis.

While we can't tell that something is science just by searching for a topic and getting a high paper count, if we search for a topic and get a very low count, that is a reason for suspecting that the topic may not be any such thing as "science with a capital S." That's what happens when I search for the topic of "engram." An engram is an alleged brain location where a memory is stored, or some kind of "memory trace" in the brain. When I search for papers having "engram" or "engrams" in their title, using the arXiv science paper server, the server gives me a count of 0 such papers.

Could it be that the arXiv science paper server just doesn't have many papers on biology? No, it has tons of papers on quantitative biology. Below are a few examples of paper counts when I search for some biology topics:

Topic	**Number of papers on arXiv server having that topic in their title**

cancer	1115 papers
COVID-19	1738 papers
brain	2046 papers
tissue	708 papers
engram	0 papers
engrams	0 papers

So how come the server gives us no papers when we search for "engram" as the topic? Maybe it's because engrams aren't really science with a capital S.

There's another way to do a search on the arXiv server. You can search for any use of the search topic in the abstract of the paper. When I do such a search, I get only 5 papers. Four of the five papers have no solid observational grounding, and are the kind of mathematical speculation papers that scientists write when they attempt to substantiate very doubtful speculations such as string theory or dark energy or primordial cosmic inflation. The only paper built upon observations is a paper entitled "Recording and Reproduction of Pattern Memory Trace in EEG by Direct Electrical Stimulation of Brain Cortex." The paper does not actually provide robust evidence that any such thing as a memory trace was detected. To do such thing, you would need to have a study group of at least 15 animals, but we read in the paper that "the experiments were performed on 5 outbred male rats." Using such a too-small study group, you have too high a chance of a false alarm.

There is another "preprint paper server," one more oriented toward biology papers. It is called bioXriv, and bills itself as "the preprint server for biology." When I use that server to look for papers that contain "engram" in the title, I get only 6 papers. Below is a comparision with other topics:

Topic	**Number of papers on biorXiv server having that topic in their title**
cancer	2777 papers
COVID-19	376 papers
brain	2651 papers
tissue	1021 papers

engram	6 papers
engrams	8 papers

The first of these six papers using "engram" in its title is a speculative paper with no observational grounding. The second of these six papers uses study group sizes of only 5, which are way too small to provide any robust result. The third paper has a similar problem, using study group sizes of only 8, way too small to provide any robust result. The fourth paper is a mouse study that fails to mention anywhere how many mice were used, which typically occurs only when some way-too-small study group size was used. The fifth paper suffers from the same problem, the only difference being that it vaguely suggests that way-too-small study group sizes of only 4 were used. The sixth paper uses way-too-small study group sizes of only about six.

Now let's look at the eight papers using "engrams" in their title. The first paper has "schematic" visuals based on imaginary hypotheticals. The second paper tries to use the word "engrams" as much as it can, but provides no physical evidence for such a thing. The third paper was a rodent study using study group sizes of only about 8, way too small for a robust result. The fourth paper was a rodent study using study group sizes of only about 5, way too small for a robust result. The paper confesses, "Data collection and analysis were not performed blind to the conditions of the experiments," a major procedural defect. The fifth paper is a theoretical paper not providing any observational results. The sixth paper and the seventh paper used way-too-small study group sizes of only 5. The eighth paper is merely a theoretical work based on mathematical simulations.

So the only six papers on the biorXiv server mentioning "engram" in their title fail to provide any robust evidence of engrams. Its the same thing for the 8 papers using "engrams" in their title. All in all, we have in these very low server counts (and the weaknesses of the papers coming up in the searches) a strong suggestion that engrams (supposed neural storage sites for memories) are not any such thing as well-established science, and that the evidence for engrams is merely very weak evidence rarely conjured up by scientists clumsily trying to provide some evidence for something they want to believe in. Engrams are not an example of science with a capital S.

My criticisms of such papers for using too small study group sizes is partially based on the guideline in the paper "Effect size and statistical power in the rodent fear conditioning literature – A systematic review," which mentions an "estimated sample size to achieve 80% power considering typical effect sizes and variances (15 animals per group)," and says that only 12% of neuroscience experiments involving rodents and fear met such a standard.

None of these papers I have referred to (on either preprint server) claims to have used a blinding protocol for both data gathering and data analysis. Most of them make no claims about blinding, which is usually a sure sign that no blinding protocol was followed. One paper makes a brief claim to have used a blinding protocol for experimentation, but makes no such claim for data analysis. Another paper claims briefly to have used a blinding protocol for statistical analysis, but makes no such claim in regard to experimentation and data gathering. None of these papers describes in detail a specific blinding protocol.

When blinding protocols are not thoroughly implemented, there is a large chance of bias and scientists reporting hoped-for effects that are not really there. Unless a paper describes in detail a blinding protocol, you should be rather skeptical that any halfway-decent blinding protocol was used. Similarly, if someone says, "I paid all my taxes," but doesn't release his tax forms, you should be rather skeptical that he did pay all his taxes.

The failure of experimental neuroscientists to adequately follow blinding protocols is a huge problem in contemporary neuroscience research, as big as the failure of most such neuroscientists to use adequate study group sizes. Be suspicious of junk science wherever you find experiments not using proper blinding protocols. A PLOS Biology article tells us, "Recent analyses have found, for example, that 86%–87% of papers reporting animal studies did not describe randomisation and blinding methods, and more than 95% of them did not report on the statistical power of the studies to detect a difference between experimental groups."

Ian Stevenson MD once made some candid comments relevant to the topic of engrams, stating this:

"Neuroscientists and psychologists cannot tell us either how we store memories or how we retrieve them. Suggestions that experiences leave 'traces' in the brain (whether in altered neural networks or otherwise) have not so far led to further understanding."

at November 08, 2020 No comments:

Labels: memory storage

Friday, October 30, 2020

Inaccurate Titles and Misleading Citations Are Common in Science Papers

I have discussed at some length on this blog problems in science literature such as poor study design, insufficient study group size, occasional fraud, misleading visuals and unreliable techniques for fear measurement. Such things are only some of the many problems to be found in neuroscience papers. Two other very common problems are:

(1) Scientific papers often have inaccurate titles, making some claim that is not actually proven or substantiated by the research discussed in the paper.

(2) Scientific papers often make misleading citations to papers that did nothing to show the claim being made.

Regarding the first of these problems, scientists often write inaccurate titles to try to get more citations for their papers. For the modern scientist, the number of citations for papers he or she wrote is a supremely important statistic, regarded as a kind of numerical "measure of worth" as important as the batting average or RBI statistic is for a baseball hitter. At a blog entitled "Survival Blog for Scientists" and subtitled "How to Become a Leading Scientist," a blog that tells us "contributors are scientists in various stages of their career," we have an explanation of why so many science papers have inaccurate titles:

"Scientists need citations for their papers....If the content of your paper is a dull, solid investigation and your title announces this heavy reading, it is clear you will not reach your citation target, as your department head will tell you in your evaluation interview. So to survive – and to impress editors and reviewers of high-impact journals, you will have to hype up your title. And embellish your abstract. And perhaps deliberately confuse the reader about the content."

Is this how today's scientists are trained?

A study of inaccuracy in the titles of scientific papers states, "23.4 % of the titles contain inaccuracies of some kind."

The concept of a misleading citation is best explained with an imaginary example. In a scientific paper we may see some line such as this:

Research has shown that the XYZ protein is essential for memory.[34]

Here the number 34 refers to some scientific paper listed at the end of the scientific paper. Now, if the paper listed as paper #34 actually is a scientific paper showing the claim in question, that this XYZ protein is essential for memory, then we have a sound citation. But imagine if the paper does not show any such thing. Then we have a misleading citation. We have been given the wrong impression that something was established by some other science paper.

A recent scientific paper entitled "Quotation errors in general science journals" tried to figure out how common such misleading citations are in science papers. It found that such erroneous citations are not at all rare. Examining 250 randomly selected citations, the paper found an error rate of 25%. We read the following:

"Throughout all the journals, 75% of the citations were Fully Substantiated. The remaining 25% of the citations contained errors. The least common type of error was Partial Substantiation, making up 14.5% of all errors. Citations that were completely Unsubstantiated made up a more substantial 33.9% of the total errors. However, most of the errors fell into the Impossible to Substantiate category."

When we multiply the 25% figure by 33.9%, we find that according to the study, 8% of citations in science papers are completely unsubstantiated. That is a stunning degree of error. We would perhaps expect such an error rate from careless high-school students, but not from careful scientists.

This 25% citation error rate found by the study is consistent with other studies on this topic. In the study we read this:

*"In a sampling of 21 similar studies across many fields, total quotation error rates varied from 7.8% to 38.2% (with a mean of 22.4%) …Furthermore, a meta-analysis of 28 quotation error studies in medical literature found an overall quotation error rate of 25.4% [**1**]. Therefore, the 25% overall quotation error rate of this study is consistent with the other studies."*

In the paper we also read the following: "It has been argued through analysis of misprints that only about 20% of authors citing a paper have actually read the original." If this is true, we can get a better understanding of why so much misinformation is floating around in neuroscience papers. We repeatedly have paper authors spreading legends of scientific achievement, which are abetted by incorrect paper citations often made by authors who have not even read the papers they are citing.

A recent article at Vox.com suggests that scientists are just as likely to make citations to bad research that can't be replicated as they are to make citations to good research. We read the following:

"The researchers find that studies have about the same number of citations regardless of whether they replicated. If scientists are pretty good at predicting whether a paper replicates, how can it be the case that they are as likely to cite a bad paper as a good one? Menard theorizes that many scientists don't thoroughly check — or even read — papers once published, expecting that if they're peer-reviewed, they're fine. Bad papers are published by a peer-review process that is not adequate to catch them — and once they're published, they are not penalized for being bad papers."

We also read the following troubling comment:

"Blatantly shoddy work is still being published in peer-reviewed journals despite errors that a layperson can see. In many cases, journals effectively aren't held accountable for bad papers — many, like The Lancet*, have retained their prestige even after a long string of embarrassing public incidents where they published research that turned out fraudulent or nonsensical...Even outright frauds often take a very long time to be repudiated, with some universities and journals dragging their feet and declining to investigate widespread misconduct."*

at October 30, 2020 No comments:

Labels: academia dysfunction, scientist misconduct

Thursday, October 22, 2020

When Mainstream "Science Information" Sites Promote Mind Poisons

Many people have the idea that if you keep reading mainstream sites that are commonly called "science information" sites, you will become a better citizen. Some people think that if you read such sites, you will frequently be reminded of how bad a problem global warming is, and that you will therefore be moved to reduce your carbon footprint. Other people think that if you read such "science information" sites, you will be a good global citizen, get all of your required vaccinations, and eat genetically modified food like our corporations wish you to do.

I'm not sure there is any very good evidence that science knowledge causes people to be better global citizens. These days a person's carbon footprint tends to be proportional to his or her wealth, a factor that is independent of a person's science knowledge. Furthermore, it is possible that after reading the articles on "science information" web sites, you might have a greater tendency to become morally indifferent. That's because sometimes our mainstream "science information" websites publish articles that might tend to destroy any moral tendencies you had, if you took seriously what you were reading.

I may use the term "mind poisons" for theories that tend to produce moral indifference in anyone who believes in them. One such theory (occasionally promoted on mainstream "science information" sites) is the theory that there are an infinite number of parallel universes containing an infinite number of copies of you, each a little different. This insane notion is the idea that every instant the universe is kind of splitting into an infinite number copies of itself, so that every possibility is actualized. There is no evidence or any good reason for believing in such nonsense, but it is occasionally sold on mainstream "science information" sites as if it was a respectable physics theory.

It is easy to explain why such a theory promotes moral indifference. If every possibility is happening, and there are an infinite number of copies of you and everyone else, each a little bit different, then there would be no point in ever acting morally. For example, if you were walking along the street, and saw someone bleeding heavily, rather than phoning for help, you would think there was no point in acting, on the grounds that regardless of what you do, there will be an infinite number of parallel universes in which the person survives, and an infinite number of parallel universes in which the person bleeds to death.

Another example of a morally destructive mind poison is the theory of determinism, the theory that humans do not have free will. Such a theory is based on the erroneous idea that decisions arise from brain states. The idea is that you have no free will because your decisions are produced by brain states, that follow inevitably from atomic arrangements. The posts on this site do a good of exploding the rationale for this philosophical theory. There is actually no understanding of how mind or memory can be brain effects, and there are very strong neuroscience reasons for believing that neither mind nor memory can be brain effects. No one has any real understanding of how neurons could ever cause an idea, a memory storage, a memory recollection or a decision. So your decisions cannot be explained away as mere brain effects, and you very much do have free will.

It is rather obvious why determinism is a morally destructive idea. If you believe that you have no free will and must act exactly as you act, then you will tend to have no guilt about anything you do. Contrary to all human experience and also contrary to what we know about the brain (something very different from commonly peddled myths about the brain), and being a very morally destructive doctrine, determinism can be accurately described as evil nonsense.

But the other day I saw the evil nonsense of determinism being promoted on a widely read web site that is commonly regarded as a "science information" web site. I will not link to the article, because my new policy is never to cause readership for those who teach such morally ruinous absurdities. I may merely note that the blog post promoting this determinism bunk was written by someone who has never shown any signs of being a serious scholar of either mental phenomena or neuroscience.

So these are two cases in which mainstream "science information" sites have promoted morally ruinous mind poisons. There is a third such case. On some of the leading sites regarded as "science information" sites, I recently read an article promoting the simulation hypothesis, the hypothesis that you are merely part of some computer simulation set up by extraterrestrials.

That sites calling themselves "science sites" would be promoting such nonsense is merely additional proof that much of what you read on such sites is neither science nor rational speculation. We have zero reasons for believing that a computer could ever produce consciousness, and have never observed any computer produce the slightest trace of consciousness. So believing that you are just part of some computer simulation is as silly as believing that your mother is merely a TV series character that climbed out of your wide-screen TV set.

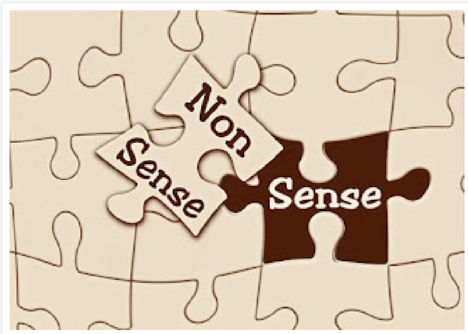
The simulation hypothesis is as morally destructive as the other two ideas I previously mentioned, although most people fail to see why that is so. The reason is that once you believe that you are merely part of a computer simulation created by extraterrestrials, you will tend to doubt that the people you observe with your eyes really exist.

If some extraterrestrials had caused your consciousness to arise by creating some computer simulation, there is not the slightest reason to think that they would follow some rule that every person observed in the simulation has their own consciousness. It would be almost infinitely easier to set up a simulation in which most of the bodies seen in the simulation were merely software routines that had no consicousness at all. That would be rather like a video game. In a video game there is a single conscious agent (yourself) interacting with various computer-generated characters that are merely software routines without any consciousness.

So once a person believes that he is part of a computer simulation created by extraterrestrials, he may tend to believe that the people he sees in the world are not conscious minds like himself, but merely "characters in the simulation," like video game characters. That simulation believer will then feel absolutely free to commit any wicked act he pleases, thinking he is not causing any real pain by doing such things. Similarly, while playing a video game you feel free to cause as much on-the-screen bloodshed as you wish, and don't worry that pain is being caused by such actions that occur in your video game.

So it should be clear that the simulation hypothesis is a morally destructive doctrine, which may lead someone to kill, injure and rape without having any remorse. We can therefore accurately say that the simulation hypothesis is a type of mind poison. But exactly this mind poison was being promoted recently on several leading mainstream sites that call themselves "science information" sites.

Clearly, we must use our critical faculties when reading what is on so-called "science information" sites, because while such sites mainly teach truth, they often promote claims that are untrue or vastly improbable, and occasionally promote mind poisons that are evil nonsense. Sadly, some of the world's worst nonsense is sometimes to be found on mainstream "science information" sites.



at October 22, 2020 2 comments:

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Head Truth

The huge case for thinking minds do not come from brains

Wednesday, October 14, 2020

The Dubious Comments Under the Neuro-Nonsense Title

Nautilus magazine is one of those slick "science information" sites where we sometimes get real science and other times get various assorted stuff that is not really science in the sense of being facts. In the latest version of the online magazine, we have an interview with neuroscientist David Eagleman. The interview is found under the ludicrous title "Your Brain Makes You a Different Person Every Day." While it is true that the proteins in the brain have such short lifetimes that an estimated 3% to 4% of your brain proteins are replaced every day, it is false that you are a different person every day. The persistence and stability of an individual's personality, memory and identity despite such heavy turnover of brain proteins is one of many good reasons for thinking that your mind and memory are not brain effects. If your brain was the source of your personhood, then given rapid brain protein turnover, you might then be a "different person every day." But it is not that, and you are not that.

In the interview, Eagleman claims, "When you learned that my name is David, there's a physical change in the structure of your brain." There is no evidence of such a thing. The claimed evidence (mainly from badly-designed mouse experiments) has a variety of flaws which makes it far less than robust evidence. No one has ever found a stored memory by examining tissue in a human brain. If the creation of a memory required "a physical change in the structure of the brain," then you could never instantly form a memory. But humans can instantly form permanent new memories. If someone suddenly sticks a gun in your mouth, you will instantly form a new memory that you will remember the rest of your life.

Eagleman states, "The brain builds an internal model of the world so it can predict what's going to happen next." There is no real evidence that such a thing happens in a brain, and no one has ever found any such thing in a brain. No neuroscientist can give a coherent and convincing explanation of how a brain could either produce thoughts or predictions.

Strangely, Eagleman seems to speak as if neurons are fighting each other inside our brains. He refers to "this aggressive background of neurons fighting against one another." Funny, I can't remember the last time I felt like I was of "two minds" about anything. In a similar dubious vein of military speculation, Eagleman then says, "my student Don Vaughn and I worked out a model showing that dreaming appears to be a way of keeping the visual cortex defended every night." That sounds like one of the least plausible theories of dreaming I have ever heard. Instead of fighting with each other, the cells in the human body show a glorious harmony in their interactions, displaying teamwork more impressive than that of a symphony orchestra or the construction crew of a skyscraper.

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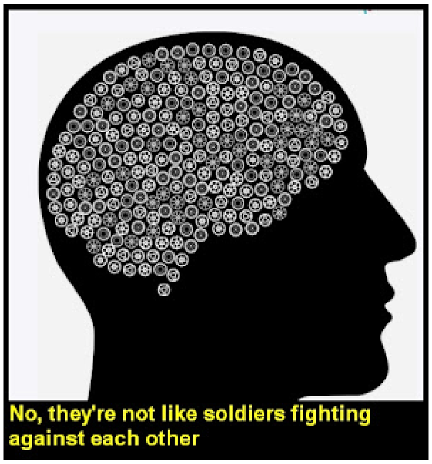

Commendably, the interviewer asks a good question by asking Eagleman about hemispherectomy patients who show little cognitive damage from the removal of half of their brains. Eagleman offers no explanation for why this would occur if the kind of dogmas he teaches are true, other than the very weak statement that "what this means is that half the real estate disappears and yet the whole system figures out how to function."

The interviewer then commendably says, "There is a backlash to this idea that everything in the mind is reducible to brain science," and asks Eagleman about that. Eagleman states very incorrectly "that critique has no basis at all." To the contrary, it has a mountainously large basis, consisting of things like the huge amount of evidence discussed in the posts on this site, very much of which consists of papers authored by neuroscientists themselves. Speaking briefly like a true-believer dogmatist, Eagleman says, "there's no doubt about this idea that you are your brain," but offers no real support for this claim other than making in the next sentence the strange claim that "Every single thing that happens in your life—your history, who you become, what you've seen—is stored in your brain."

That is a claim that in the human brain there is a record of every single thing a human has experienced, a claim that very few neuroscientists have made. If such a thing were true, it would not at all prove that "you are your brain," since your identity and self-hood and personality are a different thing than your memory. Since neuroscientists have no credible theory of either memory encoding or long-term memory storage, given a brain that replaces its proteins at a rate of about 3% per day, the more that humans remember and the longer that humans can remember, the less credible is the theory that memories are stored in brains. So Eagleman is not helping his case at all by making the strange claim that the brain stores every experience a person has ever had. If people did retain memories of every thing they had ever experienced, it would be all the more harder to explain how that could possibly occur in a brain subject to such rapid turnover and replacement of its proteins.

Eagleman offers one other little item trying to support his "you are your brain" claim, but it's paltry. He points out a neurotransmitter called dopamine can affect gambling behavior. But, of course, that does nothing to show that you are your brain. When I had a very bad toothache long ago, it sure affected by behavior, but that didn't show that I am my teeth. And if you sprained your ankle, it would briefly affect your behavior, but it wouldn't show you are your foot.

Asked about whether "one day we'll be able to map all the neural connections in someone's brain and know what kind of person that is," Eagleman says this will never happen in our lifetimes, but "maybe in 300 years, you could read out somebody's brain." But if a person believes that the brain stores memories and beliefs, he should be confident that such a thing will soon happen. If brains stored memories and beliefs, we actually should have been able to read such memories and beliefs decades ago, about the time people were first reading DNA from cells. Maybe somewhere in the back of Eagleman's mind, he knows that neuroscientists are making zero progress in reading memories and beliefs from brains, and that is what caused his pessimistic estimate.

Towards the end of the interview, Eagleman begins to contradict what he said earlier with such self-assurance. He states, "It appears that consciousness arises from the brain, but there is still a possibility of something else." When the interviewer commendably follows up on this by saying, "perhaps not everything is generated by the brain" and "we might be tuning in to consciousness somewhere else," Eagleman answers by saying, "I'm not suggesting this is the case, but I am saying this is still a possibility in neuroscience that we have to consider."

So Eagleman ends up contradicting his previous claim that "there's no doubt about this idea that you are your brain." After speaking like some supremely convinced dogmatist, he now seems to have lost his certitude, and seems to doubt his previous metaphysical claim that he said there was no doubt about. He ends by saying this regarding a theory of consciousness: "Not only do we not have a good theory, we don't even know what a good theory would look like." But such a thought clashes with his claim that "there's no doubt about this idea that you are your brain."

at October 14, 2020 No comments:

Wednesday, October 7, 2020

Engrams Are Touted Like Phlogiston Was Once Touted

Scientists were once very convinced that they had figured out how burning works. They were convinced that things burn because inside them is a combustible element or material called phlogiston, and that during burning this combustible element is released. We now know that this once-cherished theory is entirely wrong. Like the earlier scientists believing in an incorrect theory of phlogiston, many a neuroscientist believes in the dubious idea that there are engram cells that store memories. There is no robust evidence for any such thing. In the post here I discuss some of the very many reasons for rejecting such a theory of neural memory storage. In the post here I discuss some of the flaws in studies that claim to provide evidence for engrams.

A recent MIT press release claims to have some new evidence for engrams, giving us the not-actually-correct headline "Neuroscientists discover a molecular mechanism that allows memories to form." You might be impressed by hearing such an announcement from MIT, if you had not read my previous post entitled "Memory Experimenters Have Giant Claims but Low Statistical Power." In that post I examined many cases in which MIT had made impressive-sounding claims about memory research, which were based on studies that tended to be unconvincing because of their too-small study group sizes and low statistical power. It's the same old story in the latest study MIT is touting.

Here are some phrases I quote from the paper, phrases indicating study group sizes or the number of animals showing some claimed effect:

"n = 3 mice"

"n = 30 mice"

"n = 15 mice"

"n = 3 biologically independent samples"

"n = 4 mice"

"n = 4 mice"

"n = 4 mice"

"n = 4 mice"

"n = 4 mice"

Alas, we once again have from MIT a memory study that has failed to provide robust evidence. A general rule of thumb is that to get modestly persuasive results, you need to use at least 15 animals per study group. In the latest MIT study, apparently either much smaller sizes were used for some study groups, or the claimed effects occurred in only a small fraction of the animals, such as 4 out of 15 or 4 out of 30. In either case, the results are not compelling. My criticisms of such papers for using too-small study group sizes is partially based on the guideline in the paper "Effect size and statistical power in the rodent fear conditioning literature – A systematic review," which mentions an "estimated sample size to achieve 80% power considering typical effect sizes and variances (15 animals per group)," and says that only 12% of neuroscience experiments involving rodents and fear met such a standard.

To help understand why results involving only four mice are not convincing, let us imagine a large group of 1000 astrologers scanning birth and death data, eagerly looking for spooky correlations. They might look for things such as this:

- A match between a father's month of death and his son's month of birth
- A match between a father's month of death and his son's month of death
- A match between a father's month of birth and his son's month of birth
- A match between a father's month of birth and his son's month of death
- A match between a mother's month of death and her son's month of birth
- A match between a mother's month of death and her son's month of death
- A match between a mother's month of birth and her son's month of birth
- A match between a mother's month of birth and her son's month of death

Now, if one of the astrologers were to show such a match (or a similar correlation), with only a sample size of four, this would be very unconvincing

- Why Brains Are Not Suitable for Storing Long Sequences Like Humans Remember
- Why Brain Scans Don't Show Brains Make Minds
- Why Strokes, Alzheimer's Disease and Drunkenness Don't Prove the “Brains Make Minds” Dogma
- Synaptic Density Studies Contradict the Most Popular Memory Theory
- The Rare "Total Recall" Effect That Conflicts with Brain Dogmas
- Physical Connections Do Nothing to Explain Cognition
- The Sociological Reasons Why Bad Explanations Persist in Academia
- Split-Brain Cases Conflict with "Brains Make Minds" Dogma
- Why So Much of Neuroscience News Is Unreliable
- An Analogy Clarifying Why the "Brain Stores All Your Memories" Dogma Is Untenable
- Why Darwinism Fails to Explain the Human Mind
- What Is It That a Brain Does?
- Cloud Computing and a Non-Local Model of Consciousness
- Why We Do Not Understand the Origin of Complex Biological Innovations
- Our Minds May Arrive Top-Down Not Bottom-Up
- Fancy New Technology Fails to Prove Memory Dogmas
- The Argument for Determinism Collapses Once We Discard the "Minds Come from Brains" Dogma
- Animal Experiments Conflicting with the Dogma That the Brain Stores All Memories
- Memory Recall Reality Versus the "We Can't Remember Well" Bunk of Professors
- Neuroscientists Keep Using Misleading Coloring in Brain Visuals
- Most Scientists Don't Follow Formal Evidence Standards, Unlike Judges
- Experimental Evidence for ESP Is Well-Replicated
- Imaging of Dendritic Spines Hint That Brains Are Too Unstable to Store Memories for Decades
- NIH Bets $1,434,188 That Synapses Don't Store Memories
- A New Case of Very Large Brain Damage and Normal Mental Function
- When Clue-Blind Professors Ignore All the Signs

evidence. For it is not very unlikely that four such matches might occur by chance, particularly if there were many astrologers searching for such a match. If the ratio of matches was 4 out of 15 or 4 out of 30, that also would not be convincing, and not very unlikely to occur by chance. But if the sample size was much larger, showing something like 15 out of 15 such matches, that would be compelling evidence for a real effect, being something very unlikely to occur by chance. Similarly, experimental results in neuroscience papers should not persuade us when only four animals were used, or when 4 out of 15 or 4 out of 30 animals had some claimed effect. There is too big a chance that such results may be mere false alarms, the kind of matches or correlations that might be showing up merely by chance. When thousands of experimental neuroscientists are busily doing experiments and busily scanning data eagerly looking for correlations that can be interpreted as engram evidence, we would expect that very many false alarms would be popping up, particularly when too-small sample sizes were used such as only four animals, or when low-percentage effects were claimed, such as 4 out of 15 or 4 out of 30.

Once again, in the Marco paper we have a neuroscience study using mouse zapping. Typically a study claiming engram evidence will shock a mouse, and then later send some burst of energy or light to some cells where the scientists think the memory is stored. A claim will be made that this caused the mouse to freeze (in other word, not move) because the burst or energy of light has activated the fearful memory. Such a methodology is laughable. For one thing, it is hard to accurately measure the degree of freezing (non-movement) in a mouse, and judgments of a degree of freezing tend to be subjective. A measurement of heart rate (looking for a sudden spike) is a fairly reliable way to measure whether a fearful memory is being recalled, but such a technique is not used in such neuroscience studies. Also, if freezing behavior (non-movement) occurs, we have no way of knowing whether this is caused by a recall of a fearful memory, or whether it is an effect produced by the very burst of energy or light sent into the mouse's brain. It is known that there are many areas of a mouse's brain that if zapped will cause the mouse to show freezing behavior. (The Marco paper uses the same unreliable technique of judging fear by trying to measure freezing behavior of mice, rather than the reliable technique of measuring heart rate spikes.) One of quite a few reasons why trying to measure freezing behavior in mice is not a reliable way of determining fear is that fear typically produces in animals the *opposite* of freezing behavior: a fleeing behavior. Over my long life I have very many times seen a mouse around my living quarters, but never, ever saw a mouse freeze when I walked near it (the mice always fled instead).

In the MIT press release, we are told the scientists shocked some genetically modified mice, and that the mice then began to produce some protein marker. We have no way of knowing whether the production of such a protein marker had anything to do with an alleged formation of a memory in the brain. Organisms such as mice are forming new memories all the time, and also producing new proteins all the time. The formation of the protein could have been merely the result of the electrical shocking, not the formation of a new memory. Or the protein could have formed simply because proteins are constantly forming in the brain, which replaces its proteins at a rate of about 3% per day (as discussed below). Electrically shocking an organism probably produces many a brain effect that has nothing to do with memory formation. We can compare the brain during electrical shocking to a pin ball machine that lights up in many places at certain times.

The MIT press release gives a quote by the post-doc researcher Marco that gives us a hint that he may be a bit on the wrong track. We read this:

" 'The formation and preservation of memory is a very delicate and coordinated event that spreads over hours and days, and might be even months — we don't know for sure,' Marco says. 'During this process, there are a few waves of gene expression and protein synthesis that make the connections between the neurons stronger and faster.' "

It is utterly false that the formation of a memory requires "hours and days, and might be even months." To the contrary, we know that a human being can form permanent new memories *instantly*. If someone sexually assaults you or puts a gun in your mouth, you will instantly form a permanent memory of that event that will probably last the rest of your life. But protein synthesis requires many minutes. The fact that humans can form permanent new memories instantly is one of the strongest reasons for rejecting all claims that memories are formed when engrams (new cells or new cell proteins) are produced. The formation of neural engrams would necessarily take a length of time sufficient to prevent the instantaneous formation of permanent new memories.

The ability of humans to form new memories in only three seconds was shown by a scientific experiment discussed in this post.

We would take much, much longer to acquire new memories if the theory of engrams (neural memory storage) was correct. Discussing the rate of translation (something that must occur during the synthesis of a new protein), the source here states, "It was found that the rate is quite constant across proteins and is about 6 amino acids per second." A wikipedia.org article agrees, citing a speed of 6 to 9 amino acids per second. The average eukaryotic protein has a length of about 472 amino acids, according to this source. Dividing 472 by 6, we are left with the conclusion that the synthesis of a new protein must take many minutes. We cannot be forming new memories by some "engram creation" requiring the synthesis of new proteins, because we can acquire new memories instantly.

MISMATCHES THAT DEBUNK ENGRAMS (THE IDEA OF NEURAL MEMORY STORAGE)	
Time required for the creation of a permanent new memory	< 4 seconds under many cases
Time required for synthesis of new proteins needed for "engrams" (reputed brain storage places of memory)	Many minutes
Average lifetime of proteins making up synapses (reputed storage place of memories)	Less than two weeks
How long humans can retain memories	> 60 years

The 2018 paper here gives us a reason for rejecting all claims that memories are stored in brains. The paper finds that proteins in the human brain are replaced at a rate of about 3% to 4% per day. Unlike very many neuroscientists, who seem very skilled at ignoring the implications of their own findings, the authors actually seem to have a clue about the implications of their research. We read the following:

- Don't Be Fooled: Well-Trained Chatbots Aren't Minds
- What the Neuroscientist Should Have Said When Asked About Mind Uploading
- Cognitive Effects of Epilepsy Surgery Clash with "Brains Make Minds" Dogma
- Evolution Does Not Explain DNA, DNA Does Not Explain Bodies, and Bodies Do Not Explain Minds
- "Brain Chemical Imbalance" Theory Is Fading Out as an Explanation for Mental Illness
- Why Plasticity and Neurogenesis Fail to Explain Minds That Work Well After Massive Brain Tissue Loss
- They're Calling It a Huge Memory Research Fraud, But Is It Only the Tip of the Iceberg?
- So Much Misleading Talk Occurs in Claims of a Scientific Consensus
- Shrink-Speaking About a Mere "Problem of Consciousness" Is As Wrong As Shrink-Speaking About a Mere "Problem of Human Shape Origination"
- Longtermism Is Fueled by a Goofy Belief in Computer-Generated Lives
- Given Their Narrow Studies and Slim Narrow PhD Dissertations, Why Are We So Swayed by Neuroscience PhDs?
- Some of the Weak Papers Neuroscientists Cite As Evidence for Their Chief Claims
- For Insight About Your Brain and Mind, Ponder the Never-Founds
- TV Medical Dramas Give Us Wrong Ideas About Minds and Death
- Brain Imaging Shows No Appreciable Neural Correlates of Memory Activity
- The Evidence Inversion Syndrome Blights Academia
- Poorly Designed Brain Scan Experiments Needlessly Put the Needy at Risk
- Science Literature Is Full of Misleading Claims About Brain Waves
- The US Government's False Claims About DNA
- If Neuroscientists Acted Like Cosmologists, They Might Say You Have an Invisible "Dark Brain"
- Exceptionally Fast Thinking Cannot Be Explained by Slow Brains Like We All Have
- Scientists and Clergy Have Much in Common
- 30 Things That Would Never Occur If Prevailing Neuroscientist Dogmas

"Here we show that brain tissue turns over much faster at a rate of 3–4% per day. This would imply complete renewal of brain tissue proteins well within 4–5 weeks. From a physiological viewpoint this is astounding, as it provides us with a much greater framework for the capacity of brain tissue to recondition. Moreover, from a philosophical perspective these observations are even more surprising. If rapid protein turnover of brain tissue implies that all organic material is renewed, then all data internalized in that tissue are also prone to renewal. These findings spark (even) more debate on the interpretation and (long-term) storage of data in neural matter, the capacity of humans to consciously or unconsciously process data, and the (organic) basis of our own personality and ego."

The authors rightly seem to be hesitating about whether there actually is an organic basis for our personality and ego. Given a protein replacement rate of 3% per day in the brain, we would not be able to remember things for more than about 35 days if our memories were created as brain engrams.

Postscript: This month the Science Daily site (which so often has hyped headlines not matching any robust research) has been showing a headline of "New Player in Long Term Memory." The article is about a paper that suffers from the same problems as the paper discussed above. The paper provides no real evidence for any physical effect in the brain causing memory consolidation. Examining the paper, I find the same old problems that are found again and again and again in papers of this type, such as the following:

(1) Too-small study group sizes, with several being less than 8 animals per study group (15 is the minimum for a moderately reliable result).
(2) A study involving only mice, not humans.
(3) A use of an unreliable method for judging fear in animals (trying to measure the amount of time a mouse is "frozen" in fear), rather than use of a reliable fear-detection method such as measuring heart rate spikes.
(4) Citations to other papers that suffered from the same type of problems.

Looking further at the Marco paper (which is behind a paywall, but kindly provided to me by a scientist), I see other methodological problems with it. For one thing, mouse brains were studied hours after some foot-shocking of mice, which means there wasn't any real-time matching between a memory creation event and something happening in a brain. The paper also informs us that "blinding was not applied in the behavioral studies (CFC) and imaging acquisition because animals and samples need to be controlled by treatment or conditions." Blinding is a very important procedural precaution to prevent biased data acquisition and biased analysis, and we should be suspicious of experimental studies that fail to thoroughly implement blinding protocols. The paper also makes no claim to be a pre-registered study. When a study does not pre-register a hypothesis to be tested, the scientists running the study are free to go on a "fishing expedition" looking in countless places for some type of association or correlation; and in such cases there is a large chance of false alarms occurring.

at October 07, 2020 No comments:

Monday, September 28, 2020

Raven Smarts Defy Prevailing Brain Dogmas

Professors who lack any understanding of how a brain could produce intelligence like to use localization claims to try to impress us. When a

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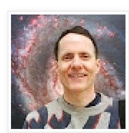

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localization claim occurs, a professor will try to impress us with his understanding by claiming that some particular mental function comes from some particular part of a brain. After hearing such claims, someone might say, "These guys may not the *how* of cognition, but at least they know the *where*." But such localization claims do not hold up well to scrutiny.

One of the main localization claims that has long been made by neuroscientists is a claim that thought or decision making come from the front top part of the brain, the prefrontal cortex. In my post here I cite many neuroscience papers giving evidence that conflicts with such a claim. For example, the scientific paper here tells us that patients with prefrontal damage "often have a remarkable absence of intellectual impairment, as measured by conventional IQ tests." The paper here tested IQ for 156 Vietnam veterans who had undergone frontal lobe brain injury during combat. If you do the math using Figure 5 in this paper, you get an average IQ of 98, only two points lower than average. You could plausibly explain that 2 point difference purely by assuming that those who got injured had a very slightly lower average intelligence (a plausible assumption given that smarter people would be more likely to have smart behavior reducing their chance of injury). Similarly, this study checked the IQ of 7 patients with prefrontal cortex damage, and found that they had an average IQ of 101.

Claims that thought comes from the prefrontal cortex have always been inconsistent with the observational reality that certain birds behave with a rather keen intelligence, despite a lack of any cerebral cortex. An article on Aeon mentions how there is little correlation between brain size and intelligence, or a correlation between intelligence and the size of a frontal cortex. The article states the following:

"Some of the most perspicacious animals are the corvids – crows, ravens, and rooks – which have brains less than 1 per cent the size of a human brain, but still perform feats of cognition comparable to chimpanzees and gorillas. Behavioural studies have shown that these birds can make and use tools, and recognise people on the street, feats that even many primates are not known to achieve."

An article on the Science Daily site states the following:

"Some birds are capable of astonishing cognitive performances to rival those of higher developed mammals such as primates. For example, ravens recognise themselves in the mirror and plan for the future. They are also able

to put themselves in the position of others, recognise causalities and draw conclusions. Pigeons can learn English spelling up to the level of six-year-old children."

There are two separate reasons why the cognitive abilities of ravens, crows and rooks argue against prevailing brain dogmas:

(1) According to prevailing brain dogmas, animals such as ravens with so tiny a brain should not be anywhere near as smart as they are.
(2) According to prevailing brain dogmas, animals such as ravens with no brain cortex should not be anywhere near as smart as they are.

In a recent "perspective" article in the journal *Science*, a scientist makes a very strange attempt to get us to believe that crows have a cortex. The opinion piece is entitled, "Birds do have a brain cortex -- and think." The author states that "birds, and particularly corvids (such as ravens), are as cognitively capable as monkeys and even great apes." Using a tricky choice of words that might fool the average reader into thinking that some birds have more neurons than creatures such as humans, the author states, "Because their neurons are smaller, the pallium of songbirds and parrots actually comprises many more information-processing neuronal units than the equivalent-sized mammalian cortices." Do not be fooled by this language. The wikipedia.org page here lists the number of neurons in rooks, ravens and parrots as about 1 or 2 billion, and the number of neurons in a human as 86 billion. So humans have more than forty times more neurons than animals such as ravens and parrots.

The author's attempt to argue that birds have a cortex is not persuasive. Referrring to a part of the bird brain called the pallium, she states, "Birds do have a cerebral cortex, in the sense that both their pallium and the mammalian counterpart are enormous neuronal populations derived from the same dorsal half of the second neuromere in neural tube development." But that's rather like saying that your ten-year-old owns an automobile, in the sense that a bicycle is a wheeled transportation vehicle capable of moving fast like an automobile. The cortex is defined as a distinctive layer of cells on the outside edge of a brain. Birds do not have such a distinctive layer of cells on the outside edge of their brains. So the very many scientists who have stated that birds do not have a cerebral cortex have spoken correctly.

The author attempts to persuade us that the pallium of a bird's brain is kind of like a cortex, by making this dubious claim: "Nieder *et al.* show that the bird pallium has neurons that represent what it perceives—a hallmark of consciousness." While we have good reason to think that the smarter birds such as ravens are conscious, there is no good evidence that any neurons of any organism represent something that the organism perceived. When we look at the reference to the paper by Nieder and his colleagues, we find that it tested only two animals. 15 animals per study group is the minimum for a moderately reliable neuroscience experimental research paper.

Another article in the journal *Science* is just as silly as the one I just discussed. The article is entitled "Newfound brain structure explains why some birds are so smart—and maybe even self-aware." The article contradicts the other *Science* article by referring to a lack of a neocortex in birds. The article refers to a paper by Onur Güntürkün and others that obscurely refers to "hitherto unknown neuroarchitecture of the avian sensory forebrain that is composed of

Labels

iteratively organized canonical circuits within tangentially organized lamina-like and orthogonally positioned column-like entities."

Another article quotes this Onur Güntürkün speaking rather more clearly:

" 'Here, too, the structure was shown to consist of columns, in which signals are transmitted from top to bottom and vice versa, and long horizontal fibres,' explains Onur Güntürkün. However, this structure is only found in the sensory areas of the avian brain. Other areas, such as associative areas, are organised in a different way."

Of course, the mere existence of such column-like structures does nothing at all to explain the smarts of birds like ravens, particularly since such structures are found only in sensory areas. There is no possible physical arrangement of neurons that would do anything at all to explain anything like intelligence in any organism. So the *Science* article headline claiming that "newfound brain structure explains why some birds are so smart" is baloney.

Postscript: A new scientific paper states that despite having tiny brains, mouse lemurs perform pretty much as well as primates with brains hundreds of times larger:

"Using a comprehensive standardized test series of cognitive experiments, the so-called 'Primate Cognition Test Battery' (PCTB), small children, great apes as well as baboons and macaques have already been tested for their cognitive abilities in the physical and social domain...For the first time, researchers of the 'Behavioral Ecology and Sociobiology Unit' of the DPZ have now tested three lemur species with the PCTB...The results of the new study show that despite their smaller brains lemurs' average cognitive performance in the tests of the PCTB was not fundamentally different from the performances of the other primate species. This is even true for mouse lemurs, which have brains about 200 times smaller than those of chimpanzees and orangutans. Only in tests examining spatial reasoning primate species with larger brains performed better. However, no systematic differences in species performances were ...found for the understanding of causal and numerical relationships nor in tests of the social domain."

Another study finds that even when ravens are only four months old, they have cognitive skills that rival those of great apes.

at September 28, 2020 No comments:

Labels: intelligence of animals with small brains

Friday, September 25, 2020

A 330-Page E-Book of Mine, Available for Free

I collected all of my posts at my blog www.headtruth.blogspot.com and placed them in a single PDF file that I uploaded to www.archive.org, where the file now exists as a 330-page E-book entitled "Why Mind and Memory Cannot Be Brain Effects." Using a huge number of references to neuroscience papers, this book discredits the common claims that the brain produces the human mind and that the brain stores memories. Such claims are not things taught us by nature, but are merely speech customs of an academia belief community, a community that has discovered many facts conflicting with such claims (facts I discuss in the book).

- hippocampus
- hyperthymesia
- hypnosis
- idea creation
- instincts
- integrated information theory
- intelligence after brain injury
- intelligence of animals with small brains
- longtermism
- memory after brain injury
- memory encoding
- memory recall
- memory storage
- mental illness
- mind uploading
- molecular machinery
- morphogenesis
- narrowness of neuroscientist studies
- natural selection
- near death experiences
- network neuroscience theory
- neural noise
- neuron nicknames
- non-local consciousness
- nonneuralism
- optogenetics
- orchestrated objective reduction theory
- origin of biological complexity
- origin of man
- origin of Mind
- origin of minds
- out-of-body experiences
- overblown hype
- panpsychism
- philosophy
- philosophy of biology
- philosophy of mind
- physicalism
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at September 25, 2020 1 comment:

Labels: recommended books

Sunday, September 6, 2020

In Neuroscience Papers Bluffing Is More Common Than Candor

The Cornell Physics Paper Server at arxiv.org is mainly useful for finding papers on physics, but it also includes many papers on quantitative biology and computer science. Below are some observations I made after searching for papers with "memory" or "thought" in the title.

Occasionally a neuroscience paper will have a little candor regarding the vast gulf between the claims neuroscientists make and the low-level data they observe. One paper gives us some indications that what neuroscientists observe on a low level is something totally different from the stability we see in long-term memories. We read the following, in which "turn over" refers to demise and replacement:

"The building blocks of the brain are in constant flux at the subcellular, cellular and circuit level. Synaptic and non-synaptic proteins are mobile [1] and rapidly turn over on the scale of hours to days [2]. Individual synapses continuously change their size and strength both in vitro and in vivo [3–5]. Most notably, however, the mature brain appears to continuously rewire itself, even without experimental intervention [6,7]. This is evident from the perpetual turnover of dendritic spines, small protrusions from the parent dendrites of most cortical neurons that are commonly used as proxies for excitatory synapses. Depending on the cell types and brain regions investigated, dendritic spines are gained and lost at rates ranging from approximately 1% per day in primary visual cortex [8] over approximately 5% per day in the CA1 region of hippocampus [9] to up to approximately 15% per day in primary somatosensory cortex [10] (but see [6,11,12] for potential pitfalls of these quantifications)."

Another paper refers to it as a "fundamental enigma" that memories can last for even weeks (which is not surprising, given the facts above). Using the acronym LTM for long-term memory, the paper says, "A fundamental enigma is how the physical substrate for storage of LTM can nonetheless be preserved for weeks, months, or a lifetime."

The paper here suggests that there is no understanding of how a brain could ever translate episodic experience or learned knowledge into neural states. The

- scientific consensus
- scientist misconduct
- simulation hypothesis
- sociology of science
- source of thoughts
- split-brain operation
- synapse theory of memory
- synaptic plasticity
- teleospiritism
- top-down theory of mind
- vaccines
- visual recognition

paper errs only in using the term "largely" when it should have used the word "totally." We read this:

"Codifying memories is one of the fundamental problems of modern Neuroscience. The functional mechanisms behind this phenomenon remain largely unknown."

The paper "Long Term Memory: Scaling of Information to Brain Size" by Donald R. Forsdyke is a paper of unusual candor. We read the following about patients whose brain regions consisted almost entirely of watery fluid rather than neurons:

"The journal Science, under the title 'Is your brain really necessary?' (Lewin 1980), described a series of 600 cases with residual ventricular enlargement that had been studied in Britain by paediatrician John Lorber (1915-1996). Again, while long-term memories were not directly assessed, intelligence quotients (IQs) were. Amazingly, in 60 of Lorber's cases, ventricular fluid still occupied 95% of cranial capacity. Yet half of this group had IQs above average. Among these was a student with an IQ of 126 who had a first class honours degree in mathematics and was socially normal....The drastic reduction in brain mass in certain, clinically-normal, hydrocephalic cases, seems to demand unimaginable levels of redundancy and/or plasticity – superplasticity. How much brain must be absent before we abandon these explanations and look elsewhere?...Regarding the human brain's 'massive storage capacity' for object details, Brady et al. (2008) have also challenged 'neural models of memory storage and retrieval.' ...The unconventional alternatives are that the repository is external to the nervous system, either elsewhere within the body, or extra-corporeal. The former is unlikely since the functions of other body organs are well understood. Remarkably, the latter has been on the table since at least the time of Avicenna and hypothetical mechanisms have been advanced (Talbot 1991; Berkovich 1993; Forsdyke 2009; Doerfler 2010). Its modern metaphor is 'cloud computing.' "

But such candor and willingness to challenge fossilized dogmas is rare. What is more common is for neuroscience papers to give us bluffing, in which an author pretends to have something he doesn't have, like a poker player with a weak hand acting as if he has a royal flush. An example is the paper "Neural origins of self-generated thought: Insights from intracranial electrical stimulation and recordings in humans." The paper would have us believe that it is presenting some evidence that brains produce thinking.

But when we look at the visuals, we see no substantial evidence for such a thing. Figure 1 and Figure 2 gives us the usual deal in which some tiny difference in signal strength is shown in a very bright color such as bright red or bright blue. But in Figure 3 we get some hard numbers. We have some graphs showing brain signal differences during thinking, and we can see from the visuals that the percent signal change was never more than a tenth of one percent, never more than 1 part in 1000. Of course, such a tiny difference in signal strength is no robust evidence at all that brains are producing thought, but is merely the kind of difference we would expect from chance variations.

A recent example of a bluffing neuroscience paper is the 21-page paper "Memory Systems of the Brain," which seems to be bluffing us in the sense that it provides no compelling evidence for such systems. We have no discussion of how a brain could translate learned knowledge or experiences into neural states or synapse states. We have no discussion of how a brain could store a memory for decades, or even for a single year. We have no discussion of how a brain could retrieve a memory.

How does the paper manage to fill up 21 pages without any such things? The paper follows various space-filling strategies used by similar papers:

(1) An historical approach is taken in which pages are filled up with a discussion of the history of human thinking about memory.
(2) Lots of space is used up with a discussion of different types of memory. For example, there is a discussion about the difference between short-term memory, working memory and long-term memory.
(3) There is a discussion of a handful of cherry-picked case histories, carefully chosen to make us believe in neuroscientist dogmas about a brain storage of memories.

There are innumerable case histories that could be quoted, but neuroscientists tend to spend excessive time citing the cases of patient H.M and patient K. C. The author of the "Memory Systems of the Brain" paper repeats the incorrect claim so often made about patient H.M, a claim that he was unable to form new memories. The paper states that patient H.M. "became unable to consciously recollect new events in his life or new facts about the world." This is not entirely correct. A 14-year follow-up study of patient H.M. (whose memory problems started in 1953) actually tells us that H.M. was able to form some new memories. The study says this on page 217:

"In February 1968, when shown the head on a Kennedy half-dollar, he said, correctly, that the person portrayed on the coin was President Kennedy. When asked him whether President Kennedy was dead or alive, and he answered, without hesitation, that Kennedy had been assassinated...In a similar way, he recalled various other public events, such as the death of Pope John (soon after the event), and recognized the name of one of the astronauts, but his performance in these respects was quite variable."

Patient K.C. was a patient who had extensive brain damage in a motorcycle accident, but could still remember learned information well. However, he was unable to provide autobiographical recollections of events before his injury. But a study of a patient with a similar problem (patient Y.K.) suggests the possibility that memory of experiences was not lost, but merely the ability to recall such information in the form of a first-person narrative. In one source we read the following:

"For example, one patient (Y.K.) was reported to have some knowledge of remote incidents in his life but was unable to 'remember' them (Hirano and Noguchi, 1998, Hirano et al., 2002). Using the Remember and Know procedure (Tulving, 1985), Y.K. assigned K responses to all of his remote recollections, indicating that he had knowledge of the events as facts but could not actually place himself mentally at the scenes where the events occurred."

The "Memory Systems of the Brain" paper seems to hint that there is no understanding of how a brain could store a memory, when it states this: "It remains unclear how neuronal cooperativity in intact networks relates to memories or how network activity in the behaving animal brings about synaptic modification " Before stating that, the paper makes this claim: "Clinical evidence indicates that damage to the hippocampus produces anterograde amnesia." But while there are a few famous cases of patients with impaired recall of past experiences after hippocampus damage, there are vastly more cases of people who could recall previous memories fairly well after the total removal of the hippocampus.

The "Memory Systems of the Brain" paper conveniently fails to mention the main research paper on the hippocampus and memory: the paper "Memory Outcome after Selective Amygdalohippocampectomy: A Study in 140 Patients with Temporal Lobe Epilepsy." That paper gives memory scores for 140 patients who almost all had the hippocampus removed to stop seizures. Using the term "en bloc" which means "in its entirety" and the term "resected" which means "cut out," the paper states, "The hippocampus and the parahippocampal gyrus were usually resected en bloc." The paper refers us to another paper describing the surgeries, and that paper tells us that hippocampectomy (surgical removal of the hippocampus) was performed in almost all of the patients.

The "Memory Outcome after Selective Amygdalohippocampectomy" paper does not use the word "amnesia" to describe the results. That paper gives memory scores that merely show only a modest decline in memory performance. The paper states, "Nonverbal memory performance is slightly impaired preoperatively in both groups, with no apparent worsening attributable to surgery." In fact, Table 3 of the paper informs us that a lack of any significant change in memory performance after removal of the hippocampus was far more common than a decline in memory performance, and that a substantial number of the patients improved their memory performance after their hippocampus was removed.

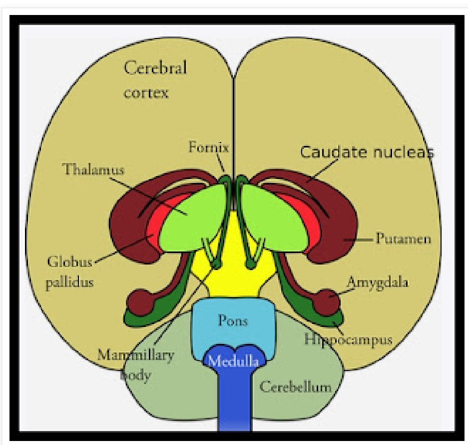
In light of these results, it is objectionable for the "Memory Systems of the Brain" paper to have made this claim: "Clinical evidence indicates that damage to the hippocampus produces anterograde amnesia." The paper should merely have stated that there are a small number of famous cases of patients who had both hippocampus damage and anterograde amnesia, but that removal of the hippocampus generally does not produce either anterograde amnesia or even a very severe decline in memory performance.

We should remember that nothing is proven by a few cases in which a small number of people had some brain damage and also a memory problem. We do not know in such cases whether there is a causal relation between the brain damage and the memory problem. If I scanned enough data in hospital records, I could surely find cases in which someone had a toothache before dying suddenly. But that would not at all prove that toothaches can produce sudden death.

The "Memory Systems of the Brain" paper presents no good evidence that memories are stored in particular parts of the brain. But it does make this claim that it completely fails to back up with any evidence: "Memories are stored in the brain in a distributed pattern in the outer layer of the cortex, related to the area of the brain that initially processed them." At the end of this statement, the paper makes a reference to another neuroscience paper, as if such a thing had been established by that paper. The paper is the paper "Declarative and Nondeclarative Memory: Multiple Brain Systems Supporting Learning and Memory" by Larry R. Squire. That paper fails to state any such claim that memories are stored in the outer layer of the cortex, and does not at all provide any substantial evidence to back up such a claim.

The "Memory Systems of the Brain" paper does cite another paper co-authored by Squire, the paper "Structure and function of declarative and nondeclarative memory system." When I examine the paper in question, I find it does not actually make the claim that memories are stored in the outer layer of the cortex, and merely weakly says that the neocortex "is believed to be the permanent repository of memory." The paper in question does not establish any claim about a storage place of memory, and merely mentions some small-effect experiments with monkeys that had damage to various regions of their cortex. None of the monkeys had any more than a small deficit in their memory performance after such damage. For example, we are told in one case of cortical damage, performance declined from 79% correct to 67% correct, and in another such case performance declined from 79% correct to 77% correct; and it is noted that cortex-damaged monkeys "were unimpaired at learning and retaining single-object discriminations." It is not very unlikely that you might get such results purely because of chance variations, particularly if you were using a small sample size less than 15.

In this paper "Structure and function of declarative and nondeclarative memory systems" we learn that the authors are relying on absurdly underpowered cortex memory studies. For example, Figure 8 refers us to an experiment using only 5 monkeys with cortex lesions, which is way too few for a reliable experimental result. The minimum for a moderately reliable result is 15 subjects per study group.



Below are some other examples of weak elements in the "Memory Systems of the Brain" paper:

(1) We are told on page 15 that neuroimaging shows that certain regions of the brain show "common activity" when memories are formed. This is irrelevant, because all regions of the brain are active during normal consciousness.
(2) We are told on page 18 that a paper showed "increased activity in the amygdala" for those who learned better. The paper in question actually only showed that those with higher levels of stress hormones in the amygdala tended to remember more. But that does nothing to show that the amygdala stores memories, but merely shows we remember better when emotionally aroused. You could do a similar test showing that people remember more what they experience when their heart rate is 130 beats per minute rather than a normal rate of only 65 beats per minute. But that would do nothing to show that memories are stored in the heart.
(3) On page 14 we are told, "Imaging studies have also illuminated the contributions of distinct prefrontal regions to encoding and retrieval." At the

end of this statement there is a reference to three papers. The first of these papers used only 6 subjects per experiment, way too small a sample size to be a reliable result (15 subjects per study group has been suggested as a minimum for reliable results, and Kelly Zalocusky PhD hints that 31 subjects per study group may be needed). The second of these papers suffered from the defect of judging strength of memory based on subjective "confidence levels" rather than objective accuracy, and also the very large defect of failing to specify how many subjects were used for the experiments (we are told 14 subjects gave their permission to be tested, but not told how many subjects actually participated; and the graphs suggest that maybe only half that many participated). The third of the papers presents no original research.

Containing some very dubious assertions, some references to weak research and some troubling omissions (such as no mention of the supremely relevant research of John Lorber or the short lifetimes of synapse proteins), the paper "Memory Systems of the Brain" is an example of a bluffing neuroscience paper (in the sense that its title suggests something the paper does not deliver). The author does nothing to describe a system of the brain capable of encoding memories. He does nothing to describe a system in the brain capable of storing memory information. He does nothing to describe in the brain a system capable of preserving memory information for decades. He does nothing to describe a system in the brain capable of retrieving memories. So he does not describe any such thing as a memory system in the brain. Nature never told us that brains store memories; it was merely neuroscientists who told us that, without any good evidence for such a claim.

at September 06, 2020 2 comments:

Labels: hippocampus, memory storage

Friday, August 21, 2020

Young Age of Languages Contradicts Claims of Neural Storage of Linguistic Information

The term “memory” refers to an extremely large set of faculties of the human mind, including all of the following:

Linguistic retrieval: the ability to recall particular stretches of words that have been memorized, and the ability to very rapidly use words you have been learned. The vast human ability for linguistic recall is shown by stage actors who memorize very large roles such as the role of Hamlet. An even greater capacity for recall is shown by Muslims who memorize every word of their holy book. Humans can also use words at dizzying speeds, which may involve people speaking at a clip of more than 2 words per second.

Literary passage recognition: the ability to identify particular literary passages when they are recited. Biblical scholars often show great capacity in this regard, and can often identify the correct biblical book (and often the exact chapter and verse number) when any of thousands of scriptural quotes are recited.

Word recognition: Humans have an immense ability to recognize words very rapidly. We see this going on whenever anyone understands someone talking very rapidly. English speakers with a good vocabulary can instantly recognize and understand more than 50,000 words.

Visual retrieval: the ability to recall in great detail particular visual experiences a person had. Legal testimony shows that humans have a very high capacity in this regard, although accuracy is probably less than for memorized literary information. Court witnesses will often give very lengthy testimony mentioning dozens of visual details of things they saw.

Visual recognition: the ability to identify a place, object or face when someone sees it. Human ability in this regard is very high. The average person can probably recognize 5000 or more objects and 5000 or more faces, even when seeing objects with large amounts of variations. For example, you can not only recognize a single photo of the latest US president, but can also recognize a hundred different photos of such a person, each with its own variations. Visual recognition occurs with blazing speed, often taking less than a fraction of a second. A person may take less than a second to start running away from an animal recognized as a danger, such as a wolf, bear or snake.

Musical retrieval: Humans have extremely impressive capacities for musical retrieval. Such abilities are shown by people such as pianists who can play hundreds of songs from memory, and opera singers who can sing all the notes of very long Wagnerian musical roles such as Tristan, Siegfried or Hans Sachs.

Musical recognition: Humans have an astonishing ability to recognize pieces of music, even when they are performed with variations. We saw this ability on television in the popular TV show *Name That Tune*.

Fast musical memorization: This very rare ability is shown by some musical savants who have the ability to memorize any piece of music they hear a single time.

There is not a single one of these capabilities that can be explained as products of the human brain. We know of no neural faculties that can explain instant visual recognition. There is no convincing evidence that any part of the brain works harder during visual recognition than during visual non-recognition. A scientific paper tells us, "Specific complex mental processes cannot be inferred directly from functional brain imaging data."

The study here is an example of a brain scan study failing to provide evidence that the brain produces visual recognition. The study has the inappropriate title "Successful Decoding of Famous Faces in the Fusiform Face Area," an idea that is not at all shown by the paper. The paper describes a brain scan study in which 17 people had their brains scanned while looking at famous faces that should have provoked recognition. According to Figure 3, 11 out of 12 brain regions checked showed a 1% or less percent signal change during facial recognition, not more impressive than we would expect to have by chance. A single tiny brain region (called Right FFA) showed a 2% percent signal change, when tested with faces of 2 Israeli prime ministers. But in a replication experiment using the famous faces of Brad Pitt and Leonardo DiCaprio, this result did not hold up, with the percent signal change being no greater than 1% for any brain region. The paper does not give any test comparing recognition versus non-recognition. All in all, this is no compelling evidence that something from a brain is retrieved when people recognize a face. Another paper also gets a result of only about 1% percent signal change when testing face recognition in different brain areas, getting only about a 1% signal difference for this FFA region. Two other papers (this paper and this paper) also find less than a 1% signal difference in this FFA region when testing facial recognition. Another paper finds only a half of 1% signal change in the FFA during face recognition. Another paper using a larger sample size of 26 people reports a signal change of much less than 1% (only a small fraction of one percent) when testing this FFA region with face recognition.

Such tiny percent signal changes do nothing to establish any reading of information from brains when visual recognition occurs. For one thing, since the sample sizes are mostly small (around 15 people per study), you could easily get a 1% or 2% signal variation by chance (just as you can easily get 55% of your coin flips being "heads" if you only flip 20 or 40 times). If there is some tiny little signal change in one region of the brain when a face is recognized, that might be something that has nothing to do with reading memory information from brains. For example, it might be a little of an alert effect or an "aha" emotional boost effect caused by the mere fact of a successful recognition.

But at least someone might argue that there was lots of time for a visual recognition capability to have evolved in a brain, and that if humans have some neural capability for fast visual recognition, such a capability might have very gradually evolved over hundreds of thousands of years, or millions of years. Such a person might argue that there was a big reason why such a capability was vital for survival. It is at least true that a species will be much more likely to survive if organisms of that species can recognize their own offspring, and instantly recognize another animal as a dangerous threat.

But in the case of language and musical memory capabilities, we have a totally different situation. There is no survival-of-the-fittest reason why any organism would have either impressive language memory capabilities or impressive musical memory capabilities. Neither language nor music is needed for an organism to survive in the wild.

There is a very big reason for disbelieving in a neural storage of linguistic information. The reason is that all of the languages used by humans are relatively recent inventions. Languages such as the English language that I speak are less than a thousand years old. There would have been no time for humans to have evolved some language storage capability for a language that has existed for such a relatively short time.

In ancient times people spoke languages such as Latin and Greek. You can see that the English language is less than a thousand years old by looking at the text of the early English poem Beowulf, which dates from about 700 to 1000 AD. Below are its opening lines (you can read the full text here):

Hwæt. We Gardena in geardagum,
þeodcyninga, þrym gefrunon,
hu ða æþelingas ellen fremedon.
Oft Scyld Scefing sceaþena þreatum,
monegum mægþum, meodosetla ofteah,
egsode eorlas. Syððan ærest wearð
feasceaft funden, he þæs frofre gebad,
weox under wolcnum, weorðmyndum þah,

oðþæt him æghwylc þara ymbsittendra
ofer hronrade hyran scolde,
gomban gyldan. þæt wæs god cyning.

It is clear from this that the English language as it is now spoken has existed for less than a thousand years. How could the brain have some elaborate system that allows Hamlet actors to store all the lines of very long English language roles such as Hamlet, when the English language has not existed for more than a thousand years? This seems impossible.

Could it be that through some miracle of rapid evolution that the human brain has acquired some great neural capability that it did not have a thousand years ago, allowing it to store lots of data from a relatively recent language such as English? All claims of rapid new function evolution are mathematically unbelievable, and there is no evidence of any such rapid change in the human brain or the human genome. The article here at a major science journal is entitled "Scientists track last 2000 years of British evolution." All that is mentioned is a few minor things such as greater lactose tolerance. There is no mention of any brain evolution. It seems that 2000 years ago people had the same brains they have now. There is no evidence that the brain has undergone any change after the birth of Jesus that might allow an ability to massively store (and instantly retrieve) words in a language that is less than a thousand years old. An article in Scientific American states, "The past 10,000 years of human existence actually shrank our brains."

A similar situation exists in regard to music. Musical notation is a relatively recent invention, an invention so recent that no melodies survive from before the time of Jesus. But Wagnerian tenors are able to memorize not just songs but musical roles that involve hours of very specific singing. No one can explain how a brain could have acquired such a vast ability in storing and retrieving musical notes given that musical notation is such a relatively recent invention, and given that musical rememberance is a superfluous skill having nothing to do with human survival.

at August 21, 2020 No comments:

Labels: memory storage, visual recognition

Monday, August 3, 2020

Study Finds Equal Brain Connectivity in All Mammals

Observational realities frequently conflict with attempts to correlate brain size and intelligence. In a scientific paper a scientist states, "After correcting for body height or body surface area, men's brains are about 100 g heavier than female brains in both racial groups." After adjusting for size, male brains are 7% larger, but there is not even a 3% difference in intelligence between males and females. Elephants have brains several times larger than human brains, but elephants are not as intelligent as humans. Removing half of a human brain in a hemispherectomy operation has no major effect on intelligence, as discussed in the posts here. Crows have high intelligence despite tiny brains, and a lack of a neocortex.

Sometimes it is argued that the real measure of cognitive ability is brain connectivity (the degree to which brain cells are connected with each other). It has been suggested that maybe humans are smarter than other mammals because our neurons are better connected. But a new study indicates that the brains of humans are not better connected than the btains of other animals. The study is announced on the Science Daily web site with this headline: "MRI scans of the brains of 130 mammals, including humans, indicate equal connectivity."

We read the following:

"Researchers at Tel Aviv University, led by Prof. Yaniv Assaf of the School of Neurobiology, Biochemistry and Biophysics and the Sagol School of Neuroscience and Prof. Yossi Yovel of the School of Zoology, the Sagol School of Neuroscience, and the Steinhardt Museum of Natural History, conducted a first-of-its-kind study designed to investigate brain connectivity in 130 mammalian species. The intriguing results, contradicting widespread conjectures, revealed that brain connectivity levels are equal in all mammals, including humans."

A Professor Assaf is quoted as stating, ""Many scientists have assumed that connectivity in the human brain is significantly higher compared to other animals, as a possible explanation for the superior functioning of the 'human animal.'" But it turns out that this assumption (a natural one from the idea that your brain is the source of your mind) just isn't true.

So we have the brain connectivity of mice, the brain connectivity of cows, the brain connectivity of sheep. This is another reason for believing that the human mind (so vastly superior to the mind of such animals) is not produced by the human brain.

at August 03, 2020 No comments:

Labels: brain connectivity

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Head Truth

The huge case for thinking minds do not come from brains

Tuesday, July 21, 2020

Preservation of Mind and Memories After Removal of Half a Brain

The idea of a *crucial experiment* or *critical experiment* is an old concept in the world of science. Such an experiment is supposedly one that leaves one particular hypothesis standing, and rules out all rival explanations or rival hypotheses. The idea that there are such experiments has been criticized by some. A simpler idea is the idea of a sink-or-swim experiment. A sink-or-swim experiment is one that either leaves some hypothesis standing as a viable hypothesis (the “swim” situation) or causes the hypothesis to be discredited (the “sink” hypothesis).

Scientists have very often claimed that the human mind is produced by the brain, and that memories are stored in the brain. A very interesting question is: could you do a sink-or-swim experiment testing such hypotheses? The experiment has actually been done, not just once but many times. I will here use the term “experiment” for medical procedures that were usually done for medical reasons such as stopping very bad brain seizures in patients. Although the doctors who did such procedures may not have considered them experiments, we can consider them as experiments in the sense of testing a particular hypothesis about the brain.

The sink-or-swim experiment for the hypothesis that the brain makes the mind and the hypothesis that the brain stores memories is to surgically remove half of the brain, and see what the effect is on the mind and memory. Such an experiment has been done many times. Almost every time the result has been that there was no major effect on consciousness, no major effect or intelligence, and no major effect on memory. The memories of people who had half of their brains removed usually preserved the knowledge and life memories they had acquired.

This is a “sink” result for this sink-or-swim experiment. The results of such surgical operations decisively refute claims that the mind is the product of the brain and claims that the brain is the storage place of memories. But addicted to materialist dogma that the mind is merely the product of the brain and that memories are stored in brains, virtually no neuroscientists have paid attention to the results of these sink-or-swim experiments. In this regard, they are like fundamentalists who keep believing that the Earth is 6000 years old despite observational results indicating our planet is billions of years old.

I have in five previous posts (here, here, here, here and here) listed very much data relating to such experiments. In this post I will not restate that data

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showing that intelligence is well-preserved after removing half of the brain, but will mostly cite some data and cases I have not previously discussed.

I can start with the results reported in the American Journal of Psychology, Vol. 46, No. 3 (Jul., 1934), pages 500-503, regarding work of W. E. Dandy, in which he removed half of the brains of patients. You can read the results in the preview here (without doing any registration). We read the following (I have put a few of the sentences in boldface):

"*Dandy has completely removed the right cerebral hemisphere from eight patients. He has performed total extirpations of one or more lobes much oftener... There are tabulated below certain generalizations on the effects of removing the right hemisphere.... The operation was the complete extirpation of the right frontal, temporal, parietal, and occipital lobes peripheral to the corpus striatum. The weight of the tissue re moved varies, with the pathological conditions involved, from 250 to 584 grm [grams].Coherent conversation began within twenty-four hours after operation, and in one case on the afternoon of the same day.* ***Later examinations showed no observable mental changes. The patients were perfectly oriented in respect of time, place, and person; their memory was unimpaired for immediate and remote events; conversation was always coherent; ability to read, write, compute, and learn new material was unaltered.*** *Current events were followed with normal interest. There were no personality changes apparent; the patients were emotionally stable, without fears, delusions, hallucinations, expansive ideas or obsessions, and with a good sense of humor; they joked frequently. They showed a natural interest in their condition and future. They cooperated intelligently at all times throughout post-operative care and subsequent testing of function.*"

It would be rather hard to imagine a more decisive refutation of the claim that the human brain is the source of the human mind, and the claim that the human brain is the storage place of human memories. Here are eight people who had half of their brains removed. Yet the people showed "no observable mental changes," and "their memory was unimpaired for immediate and remote events." The people could read, write, compute and learn just as if nothing had happened, and "there were no personality changes."

A 1966 paper was entitled "Long-term changes in intellect and behavior after hemispherectomy." The paper refers to operations in which half of a brain is removed, often to stop very bad brain seizures. This paper gives very detailed "before and after" IQ score data on 11 people who had half of their brains removed. Eight of the 11 people had the left half of their brain removed, and the other three had the right half of their brain removed. Every single one of the 11 people was able to get an improved IQ score on at least one of the tests taken *after* half of their brain was removed, a score better than a corresponding score they had got before half of their brain was removed.

Patient 1 (a P.G.) had an IQ of 128 before half of his brain was removed. After half of his brain was removed, he scored 142 on an IQ test. The paper tells us that this man with half a brain "obtained a university diploma after operation" and "has a responsible administrative position with a local authority."

The same paper refers to previous results when removing half of a brain, and notes data suggesting that such an operation has little negative effect on intelligence. Referring to intelligence, we are told that McKissock reported “short term improvement in 13 of 17 cases,” that another researcher found “significant improvement in verbal intelligence scores in a variety of tests after operation in five of 35 cases, with temporary deterioration in two, the remainder unchanged.” We are also told that White “reports improvement in personality in 80% of 134 cases” in which half of the brain was removed.

The 2013 paper "Long-term functional outcomes and their predictors after hemispherectomy in 115 children" reports this: "In this cohort of 115 children, at a mean follow-up of 6.05 years after hemispherectomy, 83% patients walked independently, 73% had minimal or no behavioral problems, 69.5% had satisfactory spoken language skills, and 42% had good reading skills." These results are for people with half-brains, and we should remember that a large fraction of people with full brains lack good reading skills. Typically a hemispherectomy operation occurs as a last resort for a child who has been long-plagued by seizures. Before the operation, such seizures may have long-disrupted normal learning. So this 42% may not even reflect any major deterioration in reading skills after removal of half a brain.

In the scientific paper here, we have on page 248 and page 250 before and after test scores for various subjects who had of their brains removed in hemispherectomy operations. The IQ score differences are slight. IQ tests don't involve learned information, but almost any IQ test would be largely a test of memory, as it would be a largely a test of ability to read test questions.

On the same pages we have before and after test scores for Peabody Picture Vocabulary Tests given to various subjects who had half of their brains removed in hemispherectomy operations. In these tests, someone is shown picture cards like the one below, and asked to name the words represented by the pictures. These tests are tests of memory retention after removal of half of the brain. On these memory tests there was no decline in the score of 21 subjects mentioned on page 248, and no decline in 7 subjects mentioned on page 250.

In an article in the New Yorker magazine, we are told of a Christina Santhouse who had half of her brain surgically removed: “When I met her, she had taken her S.A.T.s and just finished high school, coming in seventy-sixth in a class of two hundred and twenty-five." If your brain makes your mind, how could you finish in the top 34% of your class with only half a brain? The same article tells us of someone who had half of the brain removed, but made the dean's list in college, a list of the top-performing students on campus.

An article in the LA Times tells us about memory preservation in a young girl who lost half her brain:

"*How is it that 8-year-old Beth Usher of Storrs, Conn., can lose her left hemisphere, yet retain her large repertoire of knock-knock jokes? Beth's memories survived not just the loss of brain tissue, but also the 32 days that she spent in a coma, the result of some brain stem swelling that occurred in response to the trauma of surgery. Shortly after Beth regained consciousness, her father began quizzing her about people and places from her past. Brian Usher didn't get very far. 'Dad,' Beth interrupted, with a trace of impatience. 'I remember everything.'* "

On page 59 of the book *The Biological Mind*, the author states the following:

"A group of surgeons at Johns Hopkins Medical School performed fifty-eight hemispherectomy operations on children over a thirty-year period. 'We were awed,' they wrote later of their experiences, 'by the apparent retention of memory after removal of half of the brain, either half, and by the retention of the child's personality and sense of humor.' "

There is a reason why we can be confident that removal of half of a brain in hemispherectomy operations does not cause any major loss of learned memories. If there was a case of any such thing happening, you can believe that it would be endlessly recited by those who wish for us to believe that memories are stored in brains. But there is no such case, so we never hear materialists telling us about some person who suffered some dramatic loss of learned knowledge after having a hemispherectomy operation in which half of his brain was removed.

Our professors very often make biology claims that are contrary to the low-level facts of biology. The table below lists various cases in which the fantasy biology of academia dogma diverges from biology reality.

FANTASY BIOLOGY VERSUS BIOLOGICAL REALITY	
Dubious Biology Claim	**Biological Reality**
Brains store memories, probably in synapses or dendritic spines.	Neither synapses nor dendritic spines last for even a tenth of the longest time that humans can remember things, and both are made up of proteins with lifetimes of only a few weeks.
DNA stores a blueprint or recipe for making the human body.	DNA does not specify the physical structure of any of these things: an organism's body, its organ systems, its organs or its cells.
Visible biological innovations arise from a combination of random mutations and natural selection, which	It has not been proven that any visible complex biological innovation ever appeared because of random mutations and natural selection, and we know of a reason why mere DNA mutations could never produce a

improves the DNA of a species.	complex visible biological innovation: that visible physical structures are not specified in DNA.
Life appeared because of a lucky combination of random chemicals billions of years ago.	Neither a living thing nor any of the building blocks of a living thing (proteins and nucleic acids with genetic information) has ever been produced through any experimental process that realistically simulated early Earth conditions.
The building blocks of life have been found in outer space.	No one has found in outer space either of the two actual building blocks of life: proteins or nucleic acids with genetic information.
Brain scans show your brain makes your mind.	Brains scans actually show signal differences of less than 1% during thinking or recall, what we would expect from random variations.
Brain signals are real fast.	Synaptic delays, synaptic fatigue and relatively slow dendritic transmission mean that signals in the cortex must be real slow.
The common descent of all life from a single ancestor is a fact.	A shortage of transitional fossils and the lack of DNA corresponding to old fossils (because of DNA's half-life of 521 years) make the doctrine of common descent very unproven.
Chemically humans are almost exactly like chimps.	80% of proteins are different between humans and chimps.
Our minds can be explained neurally.	There is no credible neural explanation for any of the main features of the human mind: memory, self-hood, consciousness, abstract thinking, and imagination.
We kind of understand how a speck-sized egg can progress to become a full-sized baby.	We have no understanding of how this occurs (given a lack of a body plan in DNA), and do not even understand what causes cells to reproduce.
Memory and intelligence depend strongly on brain status.	A person can lose half of his brain in a hemispherectomy operation, with little effect on memory or intelligence.

The image below reproduces the table above.

FANTASY BIOLOGY VERSUS BIOLOGICAL REALITY	
Dubious Biology Claim	**Biological Reality**
Brains store memories, probably in synapses or dendritic spines.	Neither synapses nor dendritic spines last for even a tenth of the longest time that humans can remember things, and both are made up of proteins with lifetimes of only a few weeks.
DNA stores a blueprint or recipe for making the human body.	DNA does not specify the physical structure of any of these things: an organism's body, its organ systems, its organs or its cells.
Visible biological innovations arise from a combination of random mutations and natural selection, which improves the DNA of a species.	It has not been proven that any visible complex biological innovation ever appeared because of random mutations and natural selection, and we know of a reason why mere DNA mutations could never produce a complex visible biological innovation: that visible physical structures cannot be specified in DNA.
Life appeared because of a lucky combination of random chemicals billions of years ago.	Neither a living thing nor any of the building blocks of a living thing (proteins and nucleic acids with genetic information) have ever been produced through any experimental process to simulate early Earth conditions.
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Chemically humans are almost exactly like chimps.	80% of proteins are different between humans and apes.
Our minds can be explained neurally.	There is no credible neural explanation for any of the main features of the human mind: memory, self-hood, consciousness, abstract thinking, and imagination.
We kind of understand how a full baby can grow from an ovum.	We have no understanding of how this occurs (given a lack of a body plan in DNA), and do not even understand what causes cells to reproduce.
Memory and intelligence depend strongly on brain status.	A person can lose half of his brain in a hemispherectomy operation, with little effect on memory or intelligence.

Postscript: The paper "Language recovery after hemispherectomy in children with late-onset seizures" gives us before-and-after IQ scores for six children having removal of the left half of the brain (Table 1, FSIQ row). Such comparisions can be affected by short-term defecits that later are reduced. The comparison shows one child dropped 20 IQ points, one child dropped 10 IQ points, another child gained 3 IQ points, another child dropped 15 IQ points, another child gained 11 IQ points, and another child had no change in IQ. The very mixed results are consistent with the brain not being the source of the human mind.

Page 5 of the scientific paper here describes a 7-year-old girl who is "fully bilingual in Turkish and Danish" despite having had most of half of the left side of her brain removed in a hemispherectomy operation at the age of 3. We are told that except for a slight spasticity, "she leads an otherwise normal life."

at July 21, 2020 2 comments:

Labels: brain surgery, hemispherectomy, high mental function despite large brain damage

Thursday, July 9, 2020

Gender Differences in Brains Help Discredit Prevailing Dogmas About Brains

Many people are interested in differences between the brains of males and the brains of females, and differences between males and females in IQ tests and memory tests. A careful examination of this area provides some evidence against the claim that the brain is the source of human intelligence, and the claim that memories are stored in synapses of the brain.

The brains of males are significantly larger on average than females -- about 10% bigger. But we know that females tend to be shorter and weigh less than males. Some say that the relative size of female brains (female brain sizes compared to female body sizes) is no smaller than the relative size of male brains. But in a scientific paper a scientist states, "After correcting for body height or body surface area, men's brains are about 100 g heavier than female brains in both racial groups." That difference of 100 grams is about 7% of the total weight of a male brain (about 1350 grams).

So using the idea that the human mind is produced by the brain, we should expect that males do about 7% better at school and about 7% better in IQ tests. But this is not at all the case. Males and females do about the same on IQ tests, with a difference of less than 1% or 2%. In the United States females tend to get just as high academic grades as males. In this regard, the claim that the brain is produced by the mind fails the observational test.

Now let's consider human memory. The standard academic dogma (unsupported by any facts) is that memories are stored in the synapses of brains. The persistence of this dogma is mystifying, given what we know about the instability of synapses. Humans can reliably remember things for longer than 50 years, but individual synapses do not last for years. The proteins that make up synapses are very short-lived, having an average lifetime of only a few weeks.

Wikipedia.org states, "Multiple studies[22] [23] have found a higher synaptic density in males: a 2008 study reported that men had a significantly higher average synaptic density of 12.9×10^8 per cubic millimeter, whereas in women it was 8.6×10^8 per cubic millimeter, a 33% difference." The 2008 study mentioned is the study "Gender differences in human cortical synaptic density" you can read here.

Now, this 33% difference is quite a big difference, much bigger than the brain size difference previously mentioned. Under the assumption that synapses are the storage place of memory, we should expect (given this 33% greater synapse density in males) that either males tend to have stored much more memories than females, or that males are better at remembering things than females. But such things are not true.

There is no evidence that males store more memories than females. One good way of testing whether males store more memories than females is simply to look at academic scores. If males tended to store more memories, they would tend to have higher academic scores than females. But females do just as well as males in tests of learned information.

Below is a quote from an article in the New York Times indicating that boys do not do better than females (on average) in school tests:

"The study included test scores from the 2008 to 2014 school years for 10,000 of the roughly 12,000 school districts in the United States. In no district do boys, on average, do as well or better than girls in English and language arts. In the average district, girls perform about three-quarters of a grade level ahead of boys. But in math, there is nearly no gender gap, on average. Girls perform slightly better than boys in about a quarter of districts...Boys do slightly better in the rest."

Here are some quotes from the scientific paper "The Role of Sex in Memory Function: Considerations and Recommendations in the Context of Exercise":

"Females tend to outperform males in episodic memory function....Females tend to perform better than males in verbal-based episodic memory tasks, as opposed to spatial-based memory tasks [10]. Females generally access their

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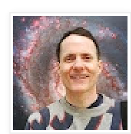

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